ARCHIVES OF OTOLOGY.

AN OPERATION FOR PROMINENCE OF THE AURICLES.

By EDWARD T. ELY, M.D., of New York.

(*With two wood-cuts.*)

The patient was a boy, aged 12, who came to the clinic of Dr. Roosa and myself at the Manhattan Eye and Ear Hospital, complaining that his companions ridiculed him on account of the prominence of his ears. He had this common deformity of the auricles to a somewhat unusual degree.

On March 1, 1881, I operated upon the right ear as follows: An incision was made through the skin, along the entire length of the furrow formed by the junction of the auricle with the side of the head posteriorly. This was joined at each end by a curved incision carried over the posterior surface of the auricle, and the skin and subcutaneous tissue included by these incisions were dissected off. Two incisions, nearly parallel to the former ones, were then carried directly through the cartilage, and an elliptical piece of the latter, measuring 1⅜ in. by ⅓ in., was removed. The piece of excised skin was considerably larger than this. The edges of the wound were then united by 10 sutures, of which 7 included only the skin, while 3 passed through both skin and cartilage. Owing to the natural folds of the cartilage, it was impossible to secure perfect coaptation on the anterior surface of the auricle, and a small space was here left to heal by granulation. The dressing consisted of absorbent cotton and a bandage. Healing ensued without accident. There was no pain and very little swelling. The posterior incision united by first intention, and the anterior wound healed rapidly by granulation. The sutures were removed on the fourth day.

The operation upon the left ear was performed on April 19th. Holding the auricle so that the light from a window shone through

it, I transfixed it with the scalpel, and rapidly excised a piece of cartilage of the desired size and shape, together with its overlying skin. Additional skin was then removed from the posterior surface, until the wound seemed to correspond in extent to that made at the former operation. Twelve sutures were used, of which three were passed through the cartilage on its anterior surface and one on its posterior surface, while the others were passed through the skin only. The dressing was the same as before, and, excepting the fact that complete union by first intention was not obtained behind, the healing was equally satisfactory. I did not like this plan of operating, however, as well as that first employed. Ether-anæsthesia was used on both occasions.

It was very interesting to observe how well these wounds of the cartilage healed. The position of the auricles is now (June 1st) all that could be desired. The posterior cicatrices are hidden by their position, and those on the anterior sur-

FIG. 1.

face are hardly noticeable. No change in the hearing, which was normal, has been observed. The accompanying wood-cuts are copied from photographs taken after the first operation. They will serve to show the position of the auricles before and after this treatment.

FIG. 2.

I do not know whether this is a new operation for the deformity in question or not, but, if allowed to judge from a single case, I can highly recommend it. Before operating, the hair should be shaved from the neighborhood of the ear, and the meatus stuffed with cotton to prevent the entrance of blood.

ANATOMICAL AND CLINICAL CONTRIBUTIONS TO THE KNOWLEDGE OF THE DISEASES OF THE NASO-PHARYNGEAL REGION AND THE EAR IN CONSUMPTION.

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ALTHOUGH our knowledge of the pulmonary diseases leading to consumption, and of the organs generally affected by them, may now be considered almost complete, it is still defective in regard to some organs, and parts of the body. This may be accounted for partly by the difficulty attending the examination of these organs, partly by the lack of attention bestowed upon them, though Wendt (*v. Ziemssen's Handbuch der Krankheiten des chylopoëtischen Apparates*, Bd. i, 1, 2te aufl., 1878, p. 246) and, later, Schalle (*Virchow's Archiv*, vol. lxxii, 2) described a method of greatly reducing these difficulties; nevertheless, this method was not taken advantage of, and to cast some additional light on the diseases of this region is, therefore, the object of this paper. The title I have chosen may need some explanation. In studying the morbid changes in this locality, I confined myself to consumptives, noting every morbid change, even those which undoubtedly cannot be ascribed to phthisis; the title chosen may, therefore, not seem entirely justifiable, but it is my belief that at least one-half of the morbid changes to be described are due to phthisis.

The results described are based upon the *post-mortem* ex-

aminations of 50 consumptives, selected without regard to age, sex, or duration of the disease, from the whole number of those who had died of phthisis within a period of about four months.

The anatomical changes in the lungs were due, in by far the greatest number of cases, to disseminated, fibrous, or caseous peribronchitis; in a few instances to tuberculous peribronchitis, caseous broncho-pneumonia, or desquamative pneumonia; sometimes to cirrhosis, or caverns of varying size and age (combinations of these different forms were, of course, not infrequent); obliterations of the pleura, sometimes partial, sometimes total, on one or both sides, often gave rise to complications. Most cases had taken a chronic course; there were only a few of acute disseminated peribronchitis, and none of acute miliary tuberculosis. Death had been caused in some instances by recent pleuritis, pneumothorax or perforating peritonitis, due to tuberculous ulcers of the intestines; every body was highly emaciated. In 8 cases the larynx was affected, in 21 the intestines, in 14 both larynx and intestines, in 7 the destructive processes were confined entirely to the lungs.

Of the whole number of cases 36 were men, 14 women; there were none under 10, 2 between 10 and 20, 14 between 20 and 30, 17 between 30 and 40, 15 between 40 and 50, 1 between 50 and 60, and 1 between 60 and 70.

The method of examination was as follows: After removing the parts of the base of the skull in question, according to Schalle's method, they were sawed through in a sagittal direction on both sides of the septum narium, then the cavity of the tympanum was opened, the semicircular canals were examined, and, finally, the cochlea and vestibule were *exposed.* In this manner all the parts in question can be carefully examined, and, owing to the small number of sections, can easily be reunited and used for demonstrations; sometimes it is advisable to remove the floor of the nasal cavity by a horizontal section, leaving only a narrow bridge to connect it with the neighboring parts.

Of the specimens obtained in this way, morbid changes were found in 29 of them in the naso-pharyngeal region or

the auditory organs; the nasal cavity and inner ear, however, did not share in them. Tuberculous affections of the nasal cavity, as is well known, are rare, only a few cases having been described so far, by B. Fränkel (*v. Ziemssen's Handbuch*, 1, p. 137), who published the case observed by Willigk, by Laveran (*Union Méd.*, 1877, No. 35), by Riedel (*Deutsche Zeitschrift für Chirurgie*), and by Tornwald (*Deutsches Archiv f. Klin. Medicin*, Bd. xxvii, H. 5 and 6, p. 588). In none of my 50 cases did I find any tuberculous affections, and, therefore, in opposition to Tornwald, believe that they are very rare in the nasal cavity. On some other occasion, however, I shall describe the case of a boy, five years old, who had died of tuberculous pleuritis and amyloid degeneration, following resection of the head of the right femur, where I found miliary tubercles on the mucous membrane of the septum narium; caseous ostitis, accompanied by the formation of several sequestra, had set in, and a number of tubercles had formed on the mucous membrane of the septum, on a line with the left middle meatus, every one of which was surrounded by a delicate wreath of blood-vessels; there was a strong fetid odor.

Of these 29 cases 10 were confined to the naso-pharyngeal region exclusively, all of them being ulcers, frequently involving *the pharyngeal ostium of the Eustachian tube*, and sometimes penetrating to the rough surface of the basilar process of the occipital bone. Men and women were equally often affected; 6 were between 20 and 30, 1 between 30 and 40, 2 between 40 and 50, and 1 between 50 and 60; only once neither the larynx nor the intestines were affected; in 5 cases there were ulcers in both, in 4 in the intestines, and in 1 in the larynx alone. This confirms the observation of Wendt and Wagner (*l. c.*, p. 302), who frequently found ulcerations in the naso-pharyngeal region, associated with ulcers in the intestines.

As regards the location of the ulcerations, it is notable that in eight of the ten cases the tonsil was affected; in the other two they were confined to the *region of the orifice of the Eustachian tube;* in four cases the mucous membrane of the latter region, on both sides, as well as of the tonsil,

had ulcerated, once only on the left side; in three of these eight cases, *the orifice of the Eustachian tube* was not affected. The auditory organs remained intact in every case, even when ulcerations had formed at the entrance to the Eustachian tube; this is the more remarkable, because in other diseases of the naso-pharyngeal region secondary changes in the auditory organs are not rare, for instance when otitis media has resulted from adenoid growths in the pharynx.

These observations agree with those of the investigators mentioned above, Wagner and Wendt, who found that in several cases of large ulcers of the tonsil the middle ear remained either entirely intact or was affected only on one side.

The form of the ulcers varied; in general those extending to the Eustachian tubes or the posterior wall of the pharynx were confined to the upper strata of the mucous membrane, while the more circumscript ulcers near the tonsils presented a crater-like appearance, and in two cases had laid bare the bone. Tuberculous eruptions, either with or without exudation, were entirely wanting. Nevertheless, I would invite clinicists and anatomists to search for ulcerations in the roof of the pharynx in those cases of phthisis in the course of which symptoms of tuberculous meningitis have developed, in order to determine whether or not any connection can be established between them.

In the great majority of cases the ulcers appeared more or less unclean, uneven, partly covered with disintegrating growths resembling granulations, partly with yellowish-brown nodules of the size of a pin-head, here and there also with punctiform ecchymoses, while a dirty, puriform, greenish-yellow viscous secretion overspread their surface; the edges of the ulcers frequently presented a ragged appearance; in some cases they were lined with the grayish-yellow nodules just mentioned, which sometimes, when the ulcers themselves were free from them, appeared in the surrounding tissue; frequently the ulcers were undermined to a considerable extent.

Besides the ulcers just described lesions of the mucous

membrane at or near the mouth of the Eustachian tube were sometimes found, which, on account of their shallow, circular shape and sharp edges, very much resembled the laryngeal ulcers of consumptives.

Besides the nodules mentioned above, hemorrhages were observed in the neighborhood of the ulcers, and also, though very seldom, cicatricial cords, presenting a very curious appearance, due to the net-like manner in which they interlaced. In two cases, the mucous membrane looked as though it were worm-eaten, an appearance due to the pores of the distended ducts of the numerous racemose glands. Here and there a few small cysts were noticed.

In order to gain an insight into the development of these ulcerations, I examined a few where tubercles could be suspected, with the microscope, without, however, being able to find any, though Wendt saw them in two cases on the border and in the neighborhood of the ulcers. Though the formation of ulcers from the disintegration of tubercles must therefore be granted in a few cases, it is certainly a very rare occurrence, and so I would give for many of them the following explanation:

The changes found consisted in a very dense infiltration of cells and nuclei, sometimes diffuse, sometimes more circumscribed, and of about the size of two or three glandular acini; sometimes it was confined to the layers nearest the epithelium, sometimes it extended in between the glands, surrounding the numerous small blood-vessels of the subepithelial layer and the distended ducts of the glands.

In some places the epithelium of the ducts still remains, in others it is missing, while dense masses of cells and nuclei fill the duct; the glands themselves appear intact, only here and there an interlobular infiltration is visible. The calibre of the blood-vessels within this zone is partly very much reduced, partly obliterated by compression. Beyond the layer of the glands there is no sign of this infiltration. Judging from this condition it, therefore, seems probable to me that in consequence of the compression of the blood-vessels necrobiotic processes are brought about, the emigrated blood-corpuscles disintegrate, the epithelium is de-

stroyed, and finally ulcers are formed, the depth of which depends upon the extent and character of the infiltration. As regards the development of these shallow lesions which sometimes occur on the mucous membrane of the orifice of the Eustachian tube, I have not arrived at any definite explanation. It is not quite clear what Wendt and Wagner (*l. c.*, p. 303) mean by the follicular origin of some of the ulcers examined by them, whether they are due to the caseous degeneration of the numerous lymph-follicles of the mucous membrane, or whether they have an origin similar to that of the follicular ulcers developing in the larynx and trachea of consumptives out of the ducts of the mucous glands of these organs.

That these ulcerations can heal has already been stated by Wendt and Wagner and is proved by the cicatricial tissue in their neighborhood, a fact which cannot seem strange when we take into consideration that we find cicatrices associated with fresh ulcers in organs which, like the larynx and intestines, are the favorite seat of tuberculous affections. I cannot, therefore, agree with Michel ("Die Krankheiten der Nasenhhöle und des Nasenrachenraumes," Berlin, 1876), who attributes all more extensive ulcerations of the naso-pharyngeal region to syphilis.

Before entering on the discussion of my clinical observations, I wish to refer briefly to the origin of the small cysts mentioned above, which I found not only in the naso-pharyngeal region, but also in the antrum of Highmore, of varying size and number, and frequently unattended by any ulcerations; while I agree with the explanation given by Wendt and Wagner (*l. c.*, p. 268 ff.) of their development, I will only add that in the cases which I examined they were retention-cysts, due to compression of the ducts of the racemose glands by the cellular infiltration of the subepithelial layer, thus preventing the discharge of their secretion; in a few cases the contents had suppurated and the membrane had become so thin that even a slight pressure was sufficient to burst the cyst. Of course, the same result might take place spontaneously, for instance, from very rapid growth, thus giving rise to a lesion which, in turn, might develop into an ulcer.

In regard to the time of appearance and subsequent course of these ulcerations, I can say the following: 1. They are sometimes found when only slight changes can be detected in the lungs, although they generally accompany the later stages of phthisis; or 2, they may remain latent and are only discovered by the *post-mortem* examination, though sometimes the painful sensations caused by their presence constitute the chief grounds for complaint. I remember, for instance, the case of a young book-keeper, 24 years old, where, in addition to tuberculous ulcerations of the epiglottis, there was a deep, crater-like ulcer near the tonsil, which was the cause of constant complaint. He continually had the sensation of mucus adhering to this spot, causing him to *hawk* violently; a crust formed at night, which could only be removed with great difficulty. Months later caseous degeneration and ulceration of the solitary follicles of the posterior wall of the pharynx set in, considerably intensifying the sufferings of the patient, and rendering the last months of his existence particularly painful. He frequently complained of a pricking pain in both ears, a symptom which I consider to be due, in many cases, to ulcerations in the naso-pharyngeal region, and not, as is generally assumed, to tuberculous ulcers of the pharynx, or lesions of the larynx, especially the posterior wall; in this I agree with Traube, who, in his "symptoms of the diseases of the respiratory organs," ascribes the pain often felt in the ear by consumptives, to ulcerations in the neighborhood of the orifice of the Eustachian tube. This is proved by those cases in which, although no ulcerations can be found in the larynx or pharynx, the patients complain of pain in the ears, and an examination with the rhinoscope reveals ulcers in the naso-pharyngeal region, especially at the *ostium tubæ;* yet I will not deny that cases occur, in which just the reverse of the morbid changes mentioned exists, to which the explanation of Fränkel, given in his paper "on tuberculosis of the pharynx" must be applied (*Berl. Klin. Wochenschr.*, Nos. 46 and 47, 1876). He ascribes the pain to perverse sensations conducted through Jacobson's and the glosso-pharyngeal nerve. In a third series of cases the ex-

amination of the auditory organs themselves gives a sufficient explanation, (to which I shall recur later,) at the same time it indicates the treatment to be resorted to.

In regard to the differential diagnosis of these ulcers I agree with Fränkel, "that the appearance of the ulcers is sufficiently characteristic to make a diagnosis," he states this to be true of the ulcers found in the pharynx of tuberculous persons, while I claim that it is also true of those of the naso-pharyngeal region, not only in the living, but also in the dead subject.

In treating these ulcers I would recommend a 1-per-cent. solution of creosote dissolved in equal parts of alcohol and glycerine. It is a preparation frequently used in Dr. Bülau's wards in cases of painful tuberculous ulcers of the larynx and pharynx, which often afforded at least temporary relief; I sometimes also applied absolute alcohol, or made use of hypodermic injections of a 2½-per-cent. solution of carbolic acid, which, applied at the angle of the jaw, caused the pain to disappear rapidly.

I shall now proceed to describe those changes which had taken place in the auditory organs. They were found diseased in 16 cases: 8 of which were complicated with affections of the naso-pharyngeal region. The other eight were confined to the auditory organs alone. Beginning with the latter, it is a curious fact that all were men, the youngest being 26, the oldest 68 years old; while three were between 40 and 50, one a little over 30, and two almost 30. In the great majority of cases, a *direct* connection can hardly be found between these morbid changes and the phthisis itself; in only two cases I consider it *possible* to speak of such a connection, though even for them I would not make any positive statements, because it remained uncertain whether phthisis had developed sooner than the morbid processes in the ear, or *vice versa.* In both cases extensive changes in the mucous membrane of the cavity of the tympanum, combined with caries of the walls, had taken place, especially in the case of a young man of 26. The drumhead of the right ear, which was the one affected, was entirely destroyed, while beyond it a bowl-shaped cavity ex-

tended, reaching from the mastoid cells to the orifice of the Eustachian tube; the ossicles were gone. A narrow strip of mucous membrane still existed on the floor of this cavity; in the remainder of it the roughened bone lay exposed; near the orifice of the Eustachian tube a sequestrum projected, still firmly attached. The whole vestibule was destroyed, the bone converted into a sandy mass, the facial nerve gone from its first inflection to its point of emergence at the stylo-mastoid foramen, and the cochlea was exposed with all its turns. The case of phthisis had been a very severe one, the pulmonary tissue had been destroyed to a great extent, cavities had formed, and there were ulcerations in the larynx and intestines.

Such extensive morbid changes in otherwise healthy persons being but very rarely caused by a purulent otitis media not dependent upon a dycrasia, it seems very probable to me, that, as this was not a primary tuberculous ostitis of the petrous portion of the temporal bone, although the existence of such an affection was put beyond doubt by Zaufal and others, it was a caseous inflammation of the mucous membrane of the tympanic cavity, "speedily followed by ulceration and degeneration of the mucous membrane. . . and sometimes by caries of the bone" (Schwartze, Pathol. Anatomie des Ohres, 1878, p. 80). In the second case also, that of a young man of 24, the right ear was the one affected; the drumhead, with the exception of a narrow crescent on the roof of the auditory canal, had been destroyed, caries of the wall of the labyrinth below and behind the promontory had begun to the extent of a pin's head, and all the ossicles were gone, while the vestibule and cochlea had remained intact. The destructive process in the lungs was mainly confined to the right side; the larynx and intestines were normal.

Such extensive destructive changes as in the first case just described, could only be wrought in the course of months, so that both the ear and lungs may have become affected at the same time, or the former may even have been the starting-point for the phthisis which afterward developed in the lungs. See also v. Troltsch (3d ed., 1867, p. 337, note),

and Urbantschitsch (*Lehrbuch der Ohrenheilkunde*, 1880, p. 370), who discuss the possibility of tuberculosis developing in connection with chronic purulent otitis media. I also observed a case of this kind about three years ago.

The case was one of a young merchant without any hereditary taint, who, in the fall of 1877, became affected with purulent otitis media, which would yield to no treatment, and greatly reduced the patient, especially through the great pain which he suffered at night. Nothing abnormal could be detected at the time in any other organ, especially the lungs; the otorrhœa was more or less profuse, and never ceased entirely; in the spring of 1878, a periproctal abscess formed, after the incision of which an incomplete external fistula of the rectum remained, which, however, after being operated, healed, though very slowly; in the meantime a cough began to trouble him, morbid changes in the apex of the lungs were discovered, tuberculosis of the intestines and ulcers of the larynx followed, and in the spring of 1879 the patient died.

Undoubtedly the phthisis of this case, was in direct connection with the purulent otitis media, and it would be of interest to know how frequent such an occurrence may be. Of course this would involve the examination of the auditory organs of every consumptive, and, when a purulent otitis media exists or has existed, the determination of its duration and its connection with the general disease.

Of the remaining six cases, four were due to a mucous (left-side) and (once) a muco-purulent (right-side) catarrh of the middle ear; twice sclerosis had begun in the tympanic cavity, which had given rise to the formation of thread-like pseudo-ligaments, partly between the ossicles themselves, partly between them and the wall of the labyrinth; the drumhead had remained uninjured, but appeared somewhat opaque; whether or not the hearing was impaired I do not know, as no tests were made, which, besides, would have no bearing on this question.

I have already stated that I do not think that any direct connection exists between these local affections and the primary disease, still, I wish to define my position more accurately, in so far as I am in complete accord with v.

Troltsch (*l. c.*, p. 242) in thinking that *phthisis predisposes to the development both of an otitis media sicca and mucipara.* In proof of this I can cite the results of my examination of the auditory organs of non-consumptive persons, where sclerosis of the middle ear was rarely found.

It now but remains to consider the last category of cases, in which both the naso-pharyngeal region and the auditory organs were affected. Here, also, most of the cases were those of men, only one of the whole number (eight) being a woman. One was between 10 and 20, two between 20 and 30, one between 30 and 40, and four between 40 and 50 (a woman among the last). Three were cases of otitis media with sclerosis, four of catarrh, and only one of purulent otitis media.

The last-mentioned case was one of a man 42 years old, who had died of caseous peribronchitis of both lungs, combined with cavities in the right upper lobe and tuberculous ulcers of the intestines, and who, during life, had complained of pain in the right ear when swallowing. Larynx and pharynx were found normal; there were no ulcerations in the naso-pharyngeal region, the mucous membrane of which was of a scarlet-red and infiltrated with numerous ecchymomata. The drumhead in the right ear was entirely destroyed, the floor and inner wall of the tympanic cavity covered with creamy pus, below which lay the rough bone of the wall of the labyrinth; the circulation between the hammer and anvil was imbedded in a jelly-like, viscous exudation; of the malleus there remained only the head and short process, and a piece of the handle about 1–2 *mm.* long; of the incus, the body and a piece of the short process; while the stapes was gone entirely.

In regard to the connection in this case between these morbid changes in the ear and the general disease, I hold the same opinion as in the case of purulent otitis media, complicated with caries of the wall of the labyrinth, which I described above, although in the absence of a history I have no sufficient proofs for this.

In the three cases of dry otitis media combined with the formation of numerous synechiæ (twice in the left ear, once

in both), the changes in the naso-pharyngeal region consisted twice in the presence of cysts in Rosenmüller's fossa or the tonsil respectively, and once in spotted extravasations of the roof of the pharynx; in the first two cases the general disease was confined to the lungs, in the last the larynx and intestines were also affected.

The remaining four cases were catarrhs of the middle ear; twice affecting both ears, and once the right, and once the left alone; in only one case (where both ears were involved) the drumhead had been destroyed. The morbid changes in the naso-pharyngeal region consisted in two cases in cicatricial bands: once in Rosenmüller's fossa, and once at the roof of the pharynx, between which the mucous membrane had sunken in; while in the two other cases ulcers had formed, one of which, of crater-like shape and situated near the tonsil, had penetrated to the bone, while the other extended as far as the orifice of the Eustachian tube on both sides. It is not improbable, therefore, that, judging from these conditions, these processes are directly connected with the coexistent changes in the auditory organs.

Aside from the functional changes, which very probably existed in every one of the 16 cases, subjective symptoms in form of pain were manifested in only one case, so that there were no indications for treatment of the aural affection; the nature of the treatment would be regulated by general principles, and need not be enlarged upon.

In conclusion, three cases remain to be reported, which were confined to the naso-pharyngeal region; retention-cysts of about the size of a bean had formed, twice in the neighborhood of the tonsil, and once near Rosenmüller's fossa, and although I do not think that any connection existed between them and the primary disease, still they may be of importance in deciding the question in regard to the frequency and nature of the idiopathic as well as secondary morbid changes of the naso-pharyngeal region, which sometimes are associated with certain general diseases. In two of these cases (men of 23 and 31) ulcerations of the larynx and intestines had formed in addition to the destructive

processes in the lungs; in the third (a woman of 43) there were also ulcers of the intestines.

The total number of specimens examined was 50, of these

36	were from men;	of these there were diseased		22
14	" women;	"	"	7
		Total,	. .	29

The morbid changes affect

the naso-pharyngeal region alone,	.	13 times.
the auditory organs alone,	. .	8 "
" " "	and naso-pharyngeal region,	8 "
	Total, . .	29

The respective ages were

between	10	and	20, ...	1
"	20	"	30, ...	10
"	30	"	40, ...	5
"	40	"	50, ...	12
"	50	"	60, ...	0
"	60	"	70, ...	1
			Total, . .	29

Sex		Age	KIND OF AFFECTION	KIND OF PHTHISIS	Complications in the	
Male	Female				Larynx	Intestines
			Affections of the naso-pharyngeal region alone.			
1		41	Ulceration of the tonsilla pharyngele.	Peribronchit. dissem., vomicæ lob. super. destr.	1	1
1		50	Ulcerations of the roof of the pharynx extending to the orifice of the Eustachian tubes; erosions on the mucous membrane of *the orifice.*	Peribronchit. dissem., vomicæ inveterat. lob. super. utr.	1	
	1	32	Bowl-shaped ulcer of the roof of the pharynx extending over the mucous membrane of the posterior wall of the pharynx.	Peribronchit. et bronchopneum. dissem. caseos.; vomicæ lob. super. d.; pleurit. adhæs. dextr.		1
	1	30	Ulceration of the orifice of the left Eustachian tube, covered with nodules.	Pneum. desquam., vom. lob. sup. utr.		1
1		26	Ulceration of the mouths of the tubes; the mucous membrane of the roof of the pharynx appears honey-combed.	Peribronchit. dissem. caseos. bilat.		1
1		26	Ulcer of the pharyngeal tonsil.	Peribronchit. dissem., caverns especially in the left upper lobe.	1	1
1		25	Ulcerations of the naso-pharyngeal region, including the posterior wall of the pharynx and the mouths of the tubes.	Peribronchit. dissem.		1
	1	25	Crater-shaped ulcer of the pharynx lined with nodules.	Peribronchit. tuberc., pleuro-obliterat. and caverns r.	1	1
	1	46	Two deep, bowl-shaped ulcers of the roof of the pharynx.	Empyema sin.; peribronchit. caseos. bilateral.	1	1
	1	27	Two ulcerations of the roof of the pharynx, one of which, situated near the tonsil, exposes the bone.	Peribronchit. dissem., vomicæ lob. super. utr.	1	1
1		31	Colloid cyst in Rosenmüller's fossa (right).	Peribronchit.; cavities.	1	1
1		23	Cyst, of the size of a bean, at the roof of the pharynx.	Peribronchit.; cavities, especially in r. upper lobe.	1	1
	1	43	Retention-cyst, near the tonsil, about half the size of a cherry-stone.	Peribronchit. dissem. caseos.; caverns in r. upper lobe.		1
			Affections of the auditory organs alone.			
1		33	Otitis media sicca bilateral.	Bronchopneum. caseos. bilat.; caverns in r. upper lobe		1
1		49	Otitis media sicca bilateral.	Peribronchit. dissem. acut.		1
1		29	Otitis med. suppur. dextr. car. creser. pariet. labyrinth (cyst in antrum of Highmore of r. side).	Bronchopneum. caseos. d.; peribronchit. apic. sin.; bronchiectasiæ.	intact	intact
1		68	Otitis med. exsudat. mucosa sin. sine perfor. mbr. tymp.	Peribronchit. dissem. tuberc. ex epididymit. caseos.	intact	intact
1		28	Otitis med. exsudat. mucosa sin. sine perfor. mbr. tymp.	Cirrhos. et peribronchit. bilateral.	1	
1		26	Otitis med. suppur. dextr., defect. mbr. tymp.; caries pariet. tympan.	Caveitis on both sides.	1	1
1		47	Otitis med. dextr. suppurat. sine perforat. mbr. tymp.	Empyema sin., peribronchit. caseos.; caverns.	intact	intact
1		47	Otitis med. mucosa sin. sine perforat. mbr. tymp.	Peribronchit. et bronchopneumon. caseosa; caverns on left side.		

Sex		Age	KIND OF AFFECTION	KIND OF PHTHISIS	Complications in the	
Male	Female				Larynx	Intestines
			Affections of the naso-pharyngeal region and auditory organs.			
	1	44	Otitis med. sicca sin., suppurated cyst near the tonsilla phar.	Cirrhos. et peribron. dissem., pleurit. adhæsiva fibrosa.	intact	intact
1		40	Otitis med. mucosa bilateral sine perforat. mbr. tymp. cicatricial cords in the roof of the pharynx.	Pneumothor. dextr., bronchopneumon. caseos. et vomicæ pulm. dextr.		1
1		42	Otitis med. suppur. dextr. c. perfor. mbr. tymp. et caries pariet. labyrinth; hemorrhages in the mucous membrane of the roof of the pharynx.	Cirrhos. lob. super. utr.; caverns in r. upper lobe, peribronchit. dissem. caseos.		1
1		19	Otitis med. mucosa sin. sine perfor. mbr. tymp.; cicatricial cords in the mucous membrane of the roof of the pharynx.	Cavities in the apices of both lungs; peribronchit. dissem.	1	1
1		25	Otitis med. sicca bilateral sine perfor. mbr. tymp.; small cyst, the size of a hempseed, in the mucous membrane of both of Rosenmüller's fossæ.	Slaty induration and peribronchit. dissem. and bronchopneumon. caseosa in both lungs.	intact	intact
1		41	Otitis med. mucosa bilateral. c. perfor. mbr. tymp. dextr. sine perfor. sin.; large ulcer of the roof of the pharynx, extending on both sides as far as the mouth of the tube.	Tuberculos. pleuræ; cavities in both lungs.		1
1		28	Otitis med. mucosa dextr. sine perfor. mbr. tymp.; crater-shaped ulcer near the pharyngeal tonsil, surrounded by cicatricial bands and small cysts.	Cirrhos. et bronchopneumon. caseos. sin.; peribronchit. et tuberculos. pulm. dextr.	1	
1		33	Otitis med. sicca sin., membr. tymp. non perfor.; ecchymos. multiplic. mucosæ tegminis pharyngis.	Pleurit. tuberculos. bilateral., peribronchit. dissem.	1	1

ON THE BAD EFFECTS OF ALUM GARGLES UPON THE TEETH.

LETTER FROM H. B. YOUNG, M.D.

DR. H. KNAPP, NEW YORK CITY.

DEAR SIR:—Recollecting you expressed in one of your clinical lectures while I was with you at the "Institute" some weeks since, a desire for information in regard to the bad effects of alum gargles upon the teeth, I contribute my mite, hoping that it may not be judged unworthy of consideration.

I will recount my experience in one case as briefly and succinctly as possible, regretting that my experience is limited to this one case and my investigations are not more thorough.

With kind regards, etc.,

H. B. YOUNG, M.D.

BURLINGTON, IOWA, *March* 14, 1881.

A young married lady living twenty-five miles out of town, suffering with chronic catarrhal otitis media, combined with pharyngitis, at my suggestion began the use of a weak alum gargle, which proved so grateful to her throat that she continued to use it freely for some two or three weeks. At the end of this period she was astonished one morning, while eating, at the sudden crumbling of a tooth.

As I had previously told her of the recent suspicions concerning the action of this almost domestic remedy, she reported herself at once to her dentist (Dr. W. P. Smith, of Monmouth, Ill., a man of more than ordinary skill and intelligence), and was assured by him that the gargle most likely had had, and if continued without the use of a counter-agent undoubtedly would have a prominent part to play for her in the way of tooth-crumbling.

She thereupon reported to me what she had learned, and to satisfy myself that there was no mistake about it, I at once addressed a note to the doctor, asking the "whys and wherefores."

I will quote from his reply :

" Alum is not a sufficiently powerful acid to do much injury in a mouth where the enamel is of good texture, heavy and *perfectly closed.* But where 'tis thin and there are *fissures* allowing it to reach the dentine, it will do the best it can to destroy the integrity of the latter. The organization of your patient's teeth is in this respect faulty. Still, if she would immediately rinse the mouth with a solution of sodium bicarbonate, she might continue the gargle with comparative safety."

Acting upon this suggestion I prescribed the soda wash. But this proving to be nauseous to the patient, both the wash and the gargle were shortly discontinued.

Taking the above explanation as correct it would seem that the action is not, as was supposed, *primary* upon the enamel (converting it into a chalky product), but *secondary*, causing degeneration by defective nutrition,—the ordinary process of decay. To my mind it is a very rational explanation ; and one much easier of comprehension than that the resistance of the enamel to external agents is in inverse ratio to its density and hardness,—the sum and substance of the direct chemical action theory.

It may, nevertheless, be incorrect, for one case and one opinion, unfortunately, do not make conclusive proof ; and alum may be proven to have a particular affinity for enamel. But correct or incorrect it has one great merit. It naturally suggests a safe plan of action, namely : when it is proposed to use an alum gargle, first examine into the condition of the teeth, and if the enamel be *thin* and *fissured* to insist upon the subsequent and immediate use of a counter-agent.

APPLICATION OF COTTON PELLETS IN DESTRUCTION OF THE MEMBRANA TYMPANI; TWO CASES.

By A. S. CORE, M.D., Quincy, Ill.

I NEED not offer any special apology for communicating some observations on the application of cotton pellets as hearing discs. I wish to call attention to the method of preparing them with vaseline as Dr. Cl. J. Blake has suggested. After the disease has become stationary I use the vaseline instead of glycerine, press the cotton-wool into wafer shape, and introduce it as lately described by Dr. Knapp. I find that vaseline does not cause the watery discharge from the ear, which the 25-per-cent. solution of glycerine causes in my cases. The vaseline being more tenacious the discs are more easily adjusted by the patient, and can be worn longer, as they do not lose their moisture so readily.

Case 1.—Miss I., aged 24, came for treatment, complaining of a discharge from both ears, which had existed since her first year and could not be stopped. She had been informed that if the discharge were stopped death would be the result. The patient's general health was good, her hearing $h \frac{1}{\infty}$, $v \frac{1}{60}$ in each ear, bone-conduction good. On examination I found that the *Mtt.* were totally destroyed, the ossicles displaced, adhesions drawing the point of the handle of the malleus inward and backward; this condition existing in both ears, with a very fetid purulent discharge; granular pharyngitis, tubes constricted. I controlled the discharge with a solution of pot. permanganate, and opened the Eustachian tubes with the catheter. I applied first the Toynbee discs, and found that they increased the hearing to about $v \frac{15}{60}$, but they were difficult for the patient to adjust and would not remain in position. Cotton pellets moistened with vaseline caused no unpleasant feeling, were easily adjusted by the patient, and increased v to $\frac{20}{60}$ in each ear. The cotton pel-

lets saturated with glycerine always caused a profuse watery discharge which would last until the glycerine was all absorbed. At times there was vertigo, which I could attribute only to the production and retention of the discharge.

CASE 2.—Mr. C. Mc., aged 28, consulted me, stating that he had had otorrhœa from his infancy. I found large perforations in both *Mtt.*, handles greatly drawn out of place, mucous membrane very much swollen and thickened, and a thin greenish muco-purulent discharge, *h* $\frac{1}{\infty}$, *v* $\frac{8}{60}$ in both ears. Bone-conduction good. I syringed the ears with a weak solution of sodium biborate, applied cotton pellets moistened with glycerine, which caused a very profuse secretion, and for a short time raised his *v* to $\frac{10}{60}$ in each ear. He returned three days later, his hearing as at first, the cotton pellets saturated with laudable pus. I continued the syringing and employed dry plugs of absorbent cotton. Six days later the discharge had nearly stopped, but the mucous membrane was red and swollen. I instructed him in introducing the cotton pellets moistened with vaseline, which increased his hearing to *v* $\frac{15}{60}$ on each side. Patient returned to his home. He has continued the use of the cotton pellets and the discharge has stopped. He removes the discs once a week, syringes the ears with a weak solution of sodium biborate, and has no cause for complaint, his hearing remaining *v* $\frac{15}{60}$.

My experience is that the pellets should not be worn at all when the discharge is abundant and offensive. When it is partly stopped, the pellets saturated with a solution of glycerine will answer best, as they surely have a good effect on the mucous membrane; but as soon as the discharge becomes scant or disappears altogether, I think that the vaseline should be used, as it has no bad effect on the mucous membrane. The vaseline pellets might be worn indefinitely, but as they are apt to become unclean in a week or two, they ought to be changed once a week after the ear has been cleansed. While my patients are under treatment I teach them how to cleanse the ears, and how to remove and replace the pellets. There is almost always a lack of cerumen in such cases, which the vaseline corrects to some extent. A bent, long, delicate wire "hairpin" answers a very good purpose for removing and replacing the discs where patients are unable to buy the angular forceps.

BILATERAL RUDIMENTARY AURICLE WITH ABSENCE OF THE EXTERNAL AUDITORY CANAL.

By H. KNAPP.

RUDIMENTARY development with bony closure of the external meatus on one side is not uncommon, but we very seldom find this condition on both. In my own practice I have seen only one such case. This case, apart from its rarity, presented several features of interest to warrant me in communicating its clinical history.

Mr. John K., æt. 30, of Washington, D. C., of healthy parentage—no consanguineous marriage—was born with a rudimentary auricle on both sides. The auricle presents a curved, crook-like ridge of skin, which in the upper curved half contains cartilage, whereas the lower half, which has the feel of the lobule, consists only of skin. Behind the rudimentary auricle there is a flat, round depression of half an inch in diameter, bordered posteriorly by a well-developed mastoid process. Placing the finger in the depression, the movements of the lower jaw are felt as distinctly and in the same manner as when the finger is placed in a healthy auditory canal. The depression behind the ear, therefore, corresponds to the external meatus. Dr. S. W. Gross, of Philadelphia, 13 years ago, unsuccessfully attempted to open the passages. A scar, running along the anterior margin of the rudimentary auricle, indicates the incisions made by the surgeon.

The whole head, and, in particular, the pharynx, nose, and jaws are well developed. A catheter can be introduced into the tubes, and the stream of air is well heard to penetrate into the tympanic cavities, when a stethoscope is applied both in front and behind the rudiment of the auricle.

He hears the watch ($\frac{2}{24}$) from all parts of the skull, but not from the teeth. Turning one ear toward the speaker, $v = \frac{1.2}{60}$ on either side. Turning the face toward the speaker and closing his eyes, $v = \frac{3.5}{60}$; it makes no material difference whether in so doing he holds nose and mouth shut or open. The audiphone does not increase his hearing. He understands loud voice with some difficulty at the distance of five or six feet, and is able to carry on a conversation, though a little laboriously. His speech has nothing strange either in loudness, pitch, or timbre. He hears all musical sounds from the lowest tone of a piano to a König's rod of 12,000 vibrations in the minute.

Apart from his ears, he is a well-developed, healthy, and strong man, of average intellect and education. He has learned the trade of a currier, and is a good workman. He consulted me not so much to have his hearing improved as to tell him where he could obtain artificial ears to mask his deformity.

ON THE HISTOLOGICAL CHANGES IN THE BONY AND SOFT PARTS OF THE MIDDLE AND INNER EAR, IN CARIES OF THE TEMPORAL BONE.

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by William C. Ayres, M.D.

(*With table iii, figs.* 1–4, *and a chart of the temperature on table iv.*)

Chronic otorrhœa of 18 *years' standing in the left ear. Loss of memb. typm. Multiple polypi. Paralysis of the n. facialis. Total deafness of left ear. Vertigo during the last* 3 *days of life. Death by abscess in the cerebellum. Caries in many parts of the pyramid, with extensive changes in the labyrinth. Hyperostosis of the mastoid process, and roof of the drum cavity.*

Franz Waschadka, 23 years of age, a miller from Bohemia, came to the clinic June 22, 1880, seeking an operation on account of the formation of polypi in his left ear. In his family, both parents are living. The father healthy, but the mother suffers from a disease of the lungs. The patient had scarlet fever when 5 years old, and since that time has suffered from a purulent inflammation of his left ear. When 13 years old he consulted a physician who found polypi, which diagnosis was confirmed by his army surgeon. He did not conclude to have an operation performed until lately. With the exception of his ear trouble his health has been good.

On examination it was found that the canal on the left side was widened, so that a speculum, the smaller end of which was 7 *mm.* in diameter, could be introduced with ease. The canal was completely filled by several polypi. Hearing entirely

lost, the tuning-forks *a' c'* and *c* being only appreciated by the right ear. When placed on the forehead, no subjective noises nor vertigo.

On the following day some of the polypi were removed with Wilde's snare, and the largest tumor with polypus forceps. It was flattened, and measured 24 *mm.* in length, 12 *mm.* in breadth and 7 *mm.* in thickness; there were irregular nodular protruberences from its surface which were again covered by cysts, the whole presenting the appearance of a strawberry excrescence. A second polypus had a rounder form 7 *mm.* in diameter, showing the beginning of nodular formations. Besides these, several round and oval pieces were removed which corresponded to the largest tumor in their structure. After the operation bleeding was copious. On the 24th and 25th the remains of the polypi were cauterized by galvano-cautery, and later the ear simply cleansed. On the 29th of the same month a solution of acetate of lead (4.0—40.0) was applied and continued only to July 2d. On using the sound, parts of swollen mucous membrane were felt, and also in the vicinity of the wall of the labyrinth, the bone had been laid bare. No tumor-remains could be discovered. Since the patient wished to return to his work, feeling healthy in everything except his ear, he was given alum to use, and instructed to return from time to time to the clinic. Returned July 17th, where there was no change in the condition of his ear. Secretion slight. He wrote on August 3d that he had been suffering for a few days with a severe pain, sometimes in the left ear and in the temple, sometimes in the left half of the occiput, that he could not close the left eye, and that the mouth was drawn over to the right side. The discharge from the ear remained the same.

On August 5th he presented himself to Moos who diagnosticated paralysis of the left facial nerve; in the canal were no relapses of polypi, but on account of his critical condition he was advised August 9th to go into the hospital and be treated by Prof. Friedreich.

In the history in the books of the hospitals[1] we find "patient looks much reduced—badly nourished, deep grooves in his neck. Cheeks red and feverish. The whole left side of his face immovable, the left corner of the mouth hanging a little; the left eye cannot be closed; the uvula hangs vertically. Pupil moderately dilated. Organs of the chest normal. Disturbances in

[1] For the completion of our notes of the case we are indebted to Dr. Thost, Assistant of Prof. Friedreich.

his stomach; tongue thickly coated; constipated; urine contains many phosphates; no albumen; its sp. grav. 1019. Temperature 38.1°. Pulse 80. At the bottom of the auditory canal is a mass of granulation tissue the size of a pea. Ordered ice bags to his head. Aq. laxativa Vienn. Ear washed with solution of salicylic acid." In the following few days the temperature varied between 38° and 38.8° (see curve, table iv.) with a pulse of 80–92, but on August 12th it rose to 39.1°, and on August 14th sank again to 37.0, with pulse at 108. His subjective condition was somewhat better; his pain had left him. As the pus had a free outlet, and we did not wish to subject the patient to the excitement of a second operation, we did not remove the small, new formation from his ear. On August 16th functional examination gave the same results as before, viz., absolute deafness on the left side. Tuning-fork on the forehead only heard by right ear. The left mastoid region was not swollen, nor sensation on pressure.

Aug. 18th. Headache more severe, and patient complained of vertigo on sitting up. Nothwithstanding the temperature was not above 37.2°, the pulse was as low as 48 to the minute. He had the appearance of one afflicted with typhus, was apathetic, his expression dull and his speech slow. Tongue thickly coated, with red edges; odor fœtidus; loss of appetite; slight nausea; passage only after aq. laxativa.

Aug. 19th. Temperature 36.7, pulse 48. Severe headache and strong vertigo. Pupils dilated.

Aug. 20th. Slight ptosis of right upper lid, pupils dilated. Sight and motion of eye normal. Retained his consciousness. No signs of paralysis of the extremities nor of the sphincters. Temperature 36.5°, pulse slow, and intermittent. Specific grav. of urine 1017, depositing a copious sediment of phosphates.

On the morning of August 21st deep coma, while during the previous night his condition had not changed. The pupils were now narrow, and the cornea insensible; drooping of the lower jaw; death at 8.15 in the morning.

At the *post-mortem* the spinal cord and also the hemispheres of the cerebrum, even the coverings, were found to be normal. On opening the tentorium cerebelli, the thin walls of an abscess in the cerebellum were broken, when a quantity of thin, green pus escaped. The abscess comprised the greater part of the left hemisphere and a small portion of the vermiform process. The substance of the brain immediately surrounding it was studded with

hemorrhagic points. Pia and arachnoidea of the same side were opaque, while the dura-mater on the posterior surface of the temporal bone was thickened and discolored, showing a small round perforation in the region of the aperture of the aquaduct vestibuli. The acoustic and facial nerves of both sides at their origin had the same microscopic appearance.

The pus from the abscess was examined immediately after the opening, and found to contain large quantities of bacteria which however is of not much importance, since we were not able to find them in the temporal bone after having been preserved in Müller's fluid. Nevertheless we mention this condition on account of the late publications of McBride and Bruce[1], and also on account of the recent interest in bacteria aroused by the investigations of Nägeli, Buchner, Pasteur, etc., and others.

As to the other organs, there was found an intense catarrh of the stomach, redness and swelling of its mucous membrane, enlargement of the intestinal follicles, and intumescence of the mesenteric glands. The nerves were very hyperæmic. Lungs normal even to the apices.

Condition of the Left Temporal Bone.

An examination of the walls of the sinuses showed them to be normal, notwithstanding that the bony ridge of the sub-petrosal sinus showed a carious defect in the middle of its course. On the posterior wall of the pyramid in the region of the aperture of the aqueductus vestibuli, a deep defect in the bone was visible. At this place the perforation of the dura mater had taken place. Shallower defects in the bone extended from this locality medially toward the lateral wall of the porus acusticus internus. The fibrous covering was thickened over the superior angle of the pyramid medially from the eminentia arcuata, on the roof of the vestibule to the hiatus canalis fallop. The hiatus itself was widened, the ganglion geniculum thickened, and the major superfical petrosal nerve maj. appeared as a thick string isolated from the ganglion. The anterior wall of the fallopian canal was for the most part destroyed from the hiatus to the anterior edge of the oval window, and at this place the facial nerve lay free and also showed a

[1] *Journal of Anatomy and Physiology*, vol. xiv, part 2.

thickening of its diameter. After chiseling open the transverse portion of the fallopian canal, centrally from the hiatus, the facial nerve appeared as a thin, gray, gelatinous string, which broke during the examination. Toward the porus acusticus it was again more consistent, and macroscopically assumed a more normal aspect.

The microscopic examination showed that the increase in size of the large petrosal nerve, was caused by a thickening of its connective-tissue sheath. In the centre were only a few nerve fibres, surrounded by a thick sheath of fibrous connective tissue, appearing as if they were protected from total destruction by the formation of new tissue around them. A more exact description of the condition of the fibres of the facial nerve centrally from the bend, will be given when we examine the labyrinth.

The roof of the drum cavity consisted of hard, thick, sclerosed bony tissue very difficult to cut, which when removed exposed a softer tumor mass that completely filled the upper part of the drum cavity, and also the mastoid antrum. It was at first considered a polypoid formation, but afteward by microscopic examination showed itself to be the mucous membrane of these cavities which was enormously thickened. Microscopic sections through the mass removed unbroken from the bone, showed that it was hollow, the sections presenting semi-circles, one end of which corresponded to the free surface of the mucous membrane, the other to its former attachment to the bone. On the outer periphery of these semi-circles of periosteal tissue, larger blood-vessels were found, while on the inner were small capillary loops, corresponding to papillæ, the interspaced of which were filled in by large cells, corresponding to the rete malpighi of the skin. In well preserved preparations, the papillæ were covered by several layers of these cells which gradually passed over into a kind of epidermus, sowing a transformation of the mucous membrane of the drum cavity into epidermis, as has already been described in connection with long standing otorhœa. The stroma of this mass was rich in blood-vessels, and densely infiltrated with small round cells. In the deeper parts corresponding

to the periosteum, on account of the larger size of the fibres, these cells were fewer in number and were flatter or more spindle shaped. If we examine these papillæ detached from their surrounding tissues they seem as if they could represent formations which could be easily transformed into polypi by an increase in growth; and indeed microscopic examination of the polyps which were removed showed a great similarity to the hypertrophied mucous membrane, with the exception that they were covered by a cylindrical epithelium.

The ossicles were destroyed with the exception of a small remnant of the head of the malleus, which was imbedded in a thick mass of mucous membrane. The tendon of the tensor tympani muscle was adhesive to the same mass, and the body of the muscle was abnormally thick. The microscope showed thickened fibre sheaths of the muscle fibres, and the fibres themselves had undergone morbid changes. While in some parts the striation of the fibres was plainly to be seen, in other localities only longitudinal striæ were visible. In a later stage of degeneration the fibres appeared swollen, thickened, and filled either with a finely granular, molecular, or a homogeneous waxy mass. Some of them showed a beaded appearance instead of the straight contour, or even a twisted condition (see fig. 2, tab. iii).

Finally the contents of the fibres were absorbed (evidently the last stage of the process), when in many places we could see only an empty tube representing the sarcolemma, whose diameter was often a minimum. The whole condition is similar to the process described by Friedrich in his work on progressive muscular atrophy with this difference, that a proliferation of the nuclei of the fibres could not be demonstrated. As Friederich considers progressive muscular atrophy as an active inflammatory process, and compares the result of the same to the degeneration of the muscle fibres in the vicinity of diseased joints, fistula and tumors, we shall not be greatly in error if we consider the degeneration of the fibres of the tensor tympani muscle resulting from chronic inflammations of the middle ear, as belonging to

this class; that is, that they take on this degeneration in consequence of the diseased condition of the neighboring parts.[1]

On sawing through the mastoid process, it was found to be totally sclerosed, and also hypertrophied, extending upward, so as to have pushed the bony ring of the sigmoid sinus backward. The distance of the mastoid antrum from the outer surface, measured in the direction of the external canal, was 2.7 *cm.*, and from the middle of the bony part of the canal in a horizontal direction backward, 2 *cm.*

The left pyramid was left in osmic acid, one per cent., for three days, and afterward decalcified according to the method given in these ARCHIVES. It was then divided into two parts by a section perpendicular to its longest axis. On separating the two halves, on the lateral piece, we could distinguish two small carious openings, separated by a body partition only 1 *mm.* wide. These stood in direct communication with the caries in the canal for the facial nerve. On the medial half was a hole several millimetres wide, filled with spongy tissue, extending below the porus acusticus internus and the cochlea. It extended laterally almost to the point of the pyramid. This carious defect opened into the fossa jugularis, whose periosteum was thickened, probably preventing the vein from being destroyed.

The opening in the medial piece corresponded to a similar one on the lateral, both being filled by the same substance.

Three or four millimetres deeper was another passage made by the caries, extending from the lateral wall of the porus acustic. int. to a cavity 1 *mm.* in diameter in the bone substance between the semicircular canals.

After removing the hypertrophied mucous membrane from the labyrinth, we found the inferior and anterior wall of the oval window destroyed by caries, but the walls of the vestibule were not changed.

There was also a round carious opening of 1 *mm.* in diameter on the promontory corresponding to the first convolution of the cochlea.

[1] We also found similar degenerations in the musc. stapedius.

With the enumeration of these numerous carious defects, seen macroscopically, the description is by no means complete, as will appear by the following:

Microscopic condition of the labyrinth.

First of all, there is a marked difference between the condition of bone of the pyramid and at the vicinity of the vestibule and semicircular canals, of the modiolus and of the capsule of the cochlea.

It was hard in cutting, and showed only isolated carious defects under the microscope, while in the modiolus and cochlea capsule these were numerous, and, indeed, were even the rule. The former was hollowed out at the sinuous base, and filled up by a mass which will be later discussed.

In the cochlea capsule there was a system of carious spaces (in section), arranged in a circular order around the cochlea canals, sometimes small, often large, round, oval, or irregular, frequently extending as far as the periosteum of the internal cavity. This was penetrated at one place near the capsule. A more exact microscopic analysis of the section furnished us the beginning of the pathological process in the bone, and also the character of the mass which filled up the carious spaces. In those sections where the periosteum was still preserved, there was always a more or less extensive infiltration of pus corpuscles between it and the edge of the bone. From here the purulent infiltration passed into the interior of the bone through the Haversian canals, covering the outer walls of the vessels. In this locality were also larger or smaller tracts where the cochlea capsule was morphologically changed, which evidently could only have been brought about by disturbance of nutrition of the bony tissue, that is, from a qualitative chemical change in the nourishing fluids in the part.[1]

We could see well-preserved cartilaginous capsules arranged in different groups in an abnormally transparent ground substance (see fig. 1, tab. iii), and we are justified in considering these appearances in the central portions of

[1] We must remember that ossifications in the cochlea capsule are somewhat analogous to the general type of metoplastic ossifications. We also find numerous islands of curilage in the normal cochlea capsule of adults.

the bone as the beginning of processes which will later result in carious holes and protuberances.

If the disturbance of nutrition goes further, the cartilaginous parts will degenerate in their capsules. In the beginning their contents will be cellular, afterward granular, and finally there will result complete necrotic degeneration of the capsule into a molecular mass, which will fill up the holes, etc., when the carious process is completed.

In other parts of the labyrinth which show apparently the usual bony structure, we found in the cavities which were produced by caries, such remnants of cartilaginous tissue, bearing evidence that in the formation of the tissue of the temporal bone, a large part of the cartilage cells persist, and are directly calcified.

As already remarked, the periosteum of the porus acusticus internus was thickened. Nevertheless, the blood-vessels were filled with blood without showing any anomaly in their shape or texture. The same was also found in the blood-vessels of the facial and acoustic nerves.

The facial showed a granular degeneration of its fibres in its transverse course through the temporal bone, while centrally from this place of softening only a very slight degeneration had taken place. The greater portion of it was enlarged by a swelling of the medullary substance, was bent and twisted, but retained the double contour (see fig. 3, tab. iii).

In the acoustic nerve the histological changes were much more manifest than in the facial. It was atrophied from beginning to end; coagulation of the myeline in the shape of cubes or concentric rings; granular degeneration or total disappearance of the medullary substance was seen, combined with a striking hyperplasia of connective tissue (see fig. 4, tab. iii).

The mass which filled up the carious defects in the modiolus was composed of vascular connective tissue; the vessels were similar to those in the periosteum of the porus acusticus internus. Besides this there were larger and smaller nests of pus corpuscles with fragments of nerve fibres.

The contents of the cavity of the lamina spiralis ossea was very much changed. In some places it contained fibres which were in connection with the nerve fibres of the modiolus, and in others these were wanting. Most of these were destroyed, and the space filled with a molecular detritus, or was empty (perhaps in the latter case, the detritus masses had fallen out in preparation).

The whole lamina spiralis membranacea was wanting from its insertion to the spiral ligaments, leaving only a detritious mass, which colored brownish-yellow with osmic acid, in which were portions of the zona pectinata.

The cavity of the vestibule seemed to be filled by the same mass; the sacculi were destroyed; there were also some fragments of the stapedius muscle (evidently brought there by preparation), pus corpuscles, fat globules, and nuclei, which colored black by osmic acid, all surrounded by a common membrane. The same condition obtained in the connective tissue portions of the superior and posterior semicircular canals, and their ampullæ, and also in a small part of the horizontal canal, which was still preserved. The nuclei of the cells of the epithelium were wanting in many places, in others they were filled up with dark ganules. The region of the crista of one of the ampullæ was infiltrated with dark granules, and also with small and large fat globules, colored by the osmic acid. These were probably the remains of the degenerated nerve substance, since the fibres in the vicinity had lost their double contours, showing here and there a very small axis-cylinder.

Remarks.—Since this case is remarkable for several reasons, we have thought it advisable to return again to its principal points of interest. Above all, it seems astonishing that the patient should have retained his capacity for work for so long a time, notwithstanding the extensive degeneration in the region of the pyramid, which had probably existed for a long time, and only became pronounced in its effects of late.

The different products of degeneration, brought about by a chronic inflammation, indicate an extended caries; and these products, again, seem to have furnished a cer-

tain protection against the rapid destruction of important parts, thereby saving the patient's life (provided his other organs were normal). For instance, the thickening of the dura mater behind the temporal bone, also its prolongation into the porus acusticus internus arrested the progress of the disease toward the brain; also the hyperostosis of the roof of the drum cavity, and the hyperplasia of the venous walls, and also of the periosteum of the fossa jugularis,[1] protected the vein from injury and consequent death by hemorrhage.

Further, the thickening of the connective tissue surrounding the horizontal part of the facial nerve; and of the major superficial petrosel nerve, in the vicinity of its connection with the ganglion geniculi, and, lastly, the sclerosis of the mastoid process, can be reckoned as a protecting condition, since they all tended to retain the products of suppuration within the cavities where they were found.

It is also remarkable that the left half of the palate was not paralyzed in consequence of the total destruction of the facial in its transverse portion, or before the exit of the larger superficial petrosal nerve. The uvula was straight, so that the evidence of this case is directly opposed to the opinion of some that the motor innervation of the velum is derived from the facial nerve through the spheno-palatine ganglion, and by the posterior palatine nerves by way of the large superficial nerves of the temporal bone.[2]

In regard to the fatal result of the case; from the temperature we were able to suspect an encephalic process with great probability. Notwithstanding the fact that the patient was treated only during the last 12 days of life, by the condition of the temperature we could exclude meningitis, and also phlebitis of the cerebral sinuses. The disease began without chills, and only on the fourth day (in the evening) the temperature rose to 39° C., and showed no fever from the sixth day on (reckoned from his entrance into the hospital).[3]

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[1] Compare Moos. Clinic for Ear Diseases, p. 250, remarks concerning a preparation in Politzer's collection.

[2] Compare our remarks in vol. x, page 30, of these ARCHIVES.

[3] Perhaps this condition stands in some connection with the suppuration in the brain, which was established at this time.

We may, however, hesitate between the diagnosis of an abscess in the brain and basilar meningitis. The pulse remained slow up to the last day, when, as in the last-mentioned disease, it always increases in frequeucy toward the end; also the absence of loss of vision, of convulsions or paralyses of the extremities, and the rythmical respiration speak against basilar meningitis. On account of the pain in the left side of the back of the head, and the vertigo caused by sitting up in bed, we were lead to think of an encephalic process in the cerebellum.

As to the symptom of vertigo, it might be uncertain whether it was caused by the condition of the ampullæ and semicircular canals, or by the disturbances in the cerebellum.[1]

Aside from the question of the correctness of the hypothesis of a centre of equilibrium in the ampullæ, we would insist that in this case there was a direct implication of the centre of equilibrium in the cerebellum, and for the following reasons:

From physiological experiments it has been determined that marked disturbances of equilibrium occur on irritating the peripheric ends of the vestibular nerves by traumatic influences, chemical or galvanic excitations, etc. (Spamer) Lesions of the nerve trunk and division of it, caused no such disturbances. Schiff was unable to remark unsteadiness in gait produced by section of the acoustic nerve, and was therefore sceptical as to this function for the vestibular nerves. It is possible that in the case of man a sudden impulse or a certain degree of continued irritation of the nerve endings in the ampullæ, might bring about severe symptoms of Ménière's disease, but in an extensive distribution in the labyrinth, or a section of the connection with the centre of coördination in the brain, this could not be the case.

According to this view, many cases which seemed to oppose the idea of a sense of equilibrium, are explained. The general course of Ménière's disease is, that besides the deaf-

[1] There was a complication of the oculo-motor nerves (paralysis of the major levator palpebræ, suppuration and dilation of the pupils), but the motions on the eyeballs themselves were not interfered with; therefore, the vertigo could not have come from a paralysis of the ocular muscles.

ness, vertigo and subjective noises, fainting and vomiting occur, and in the better cases the latter symptom may disappear, but complete deafness, or very bad hearing remains. Instead of assuming that only the acoustic portion of the eighth pair, or that the cochlea alone had suffered, and that the portion for equilibrium had returned to its normal condition, we can also imagine that *the above symptom can also disappear after a complete destruction of both parts of the nerve.* According to this it would have to be supposed that in one-sided lesions the normal organ of the other side would have to keep up the function of equilibrium, while in double-sided destruction, the sense of sight, touch, and muscular movement would, in time, supply its place. [1]

In a similar manner we could also explain those cases in which the conduction of the nerves of equilibrium had been done away with in such a manner as not to produce an excessive irritation, or suddenly, by a trauma or by an acute inflammatory process. In such cases this sense can be suddenly destroyed without the occurrence of symptoms of vertigo, fainting, etc. In the first category, we can place Moos' case of Pachymeningitis (these ARCHIVES, vol. ix, page 97), and also the present case; in the second we may mention the case of gunshot wound, from the same author, (these ARCHIVES, vol. ii, p. 119), and also the one of Bing, viz., acute rheumatic paralysis of the acoustic nerve with complete deafness, without vertigo, etc. (*Wiener Med. Wochenschr.*, 1880, No. 11.)

In applying this to our present case, we would again call attention to the fact that hearing was already lost in the left ear at the time the patient came under observation. According to the examinations, it was found that the caries was more pronounced in the cochlea than in the region of the semicircular canals; and further, we could conclude from the connective-tissue degeneration of the acoustic nerve in the internal-auditory meatus that the inflammatory process in it, must have been of longer standing. If we consider

[1] Compare the case which Politzer described at the Congress in Milan: acquired double-sided destruction of the semicircular canals from bony oblitera tion, without any disturbance of equilibrium.

that the trunk of the nerve in the inner ear, and also that of vestibular nerves, were slowly destroyed by chronic inflammation, or had become paralyzed in the earlier stages of the disease, we can explain why it was that the disturbances in the region of the semicircular canals, which happened later, could not have been conducted from the periphery to the central organ.

If we distinguish the two conditions of irritation and paralysis of the acoustic portion of the eighth nerve, we easily see how subjective noises are sometimes present in diseases of the labyrinth, and sometimes not, and in the present case that they must necessarily have been absent. If we repeat again the foregoing, we believe that we are justified in stating that the series of conditions has been the following: *Caries of the cochlea; degeneration of the acoustic nerve in the vicinity of the inner ear; destruction of the parts in the vestibule; the semicircular canals and their ampullæ.*

If this be the case, we must attribute the vertigo, which set in only on the third day before death, to a probable extension of the encephalic process in the middle portion of the cerebellum to those parts which belong to the vermiform process, whether the centre of equilibrium itself was affected or the body of the nerves which lead to it.[1]

As to therapeutics, the pathological and anatomical conditions in this case are very important, viz., the extensive hyperostosis of the mastoid process, and the numerous macroscopic and microscopic carious spots in the pyramid. One of these conditions, viz., the hyperostosis, would have made the surgical opening of the mastoid process extremely difficult, even for the most skillful op-

[1] Nothnagel remarks in his article on vertigo (Ziemssen's Handbook of Special Pathology and Therapeutics, supplementary vol. page 199). "We can consider that the sensation of vertigo can be brought about in a variety of conditions of the cerebellum, and transmitted to the centre of consciousness, the cerebrum. Experiment has shown that various kinds of distructions in these parts, including the greater part of the cerebellum, can take place and remain without effect." He further remarks: "only the destruction of the deeper nerve tracts show themselves to have effect, and the question still remains as to whether these deeper basilar layers of the cerebellum serve only as ways of transmission of fibres which pass to the real centre of coördination situated in some other locality."

erator,[1] and even if it were done in a perfect manner, the other conditions would have marred the clinical result, since we believe, and the readers probably also, that the extensive carious degenerations in the whole pyramid would have rendered the opening of the mastoid useless. On the contrary, such conditions of caries in the pyramid must warn us that in every case of long standing suppuration, in which other features lead us to consider an opening of the mastoid cells, we must be very careful, since, with our present facilities, we can not diagnosticate a carious condition of the pyramid of the temporal bone, as was in this case. If we open the mastoid in such a case as the present, the surgical interference will certainly hasten the death of the patient. Just the impossibility of diagnosticating such a condition in long standing suppuration in the ear, even if the patient's constitution is the best, and he feels perfectly well, should make us very careful in framing a prognosis.

Description of figures in table iii.

Fig. 1.—A section of a part of the interior of the cochlea capsule just commencing to become caseous, Hartnack $\frac{3}{8}$. In the middle of the field of vision we find a large irregular mass with many spaces, which is partially surrounded by normal bony tissue. The space is filled with cartilagineous capsules sometimes isolated, sometimes grouped together. The ground substance is more transparent than normal. Left is a small part presenting the same characteristics, *kp*. Blood-vessel at *g*.

Fig. 2.—A teased preparation from the tensor tympanic muscle Hartnack $\frac{8}{9}$ immersion. Right and left in the figure are normal muscle fibres, lying in the middle, and separated from these by connective tissue are pathological fibres. The change consists in a widening and an intestinal-like shape of the muscle tubes. The striation is somewhat indistinct, and, in places, entirely lost. In their stead we sometimes see a finely granular, opaque albumenous mass.

Fig. 3.—Three nerve fibres from a teased specimen of the fa-

[1] In regard to the frequent occurrence of hyperostosis of the mastoid process compare the article of J. O. Green: Osteo-sclerosis of the mastoid.—*Transactions of the American Otological Society*, vol. ii, part 4.

cial nerve. Hartnack $\frac{8}{9}$ immersion. The double contour is still to be seen, the fibres themselves present a swelling of their medullary substance.

Fig. 4.—Is from a teased prepuration of the cochlea nerve. Hartnack $\frac{8}{9}$ immersion. We notice a number of nerve fibres which have lost their double contours. The fibres themselves are larger from a swelling of the medullary substance. This substance is undergoing a process of degeneration and coagulating in the shape of cubes or concentric rings. In some of the fibres (left below and right above) were obscure only nuclei which are placed in rows, and the fibres themselves very much reduced in size. Between the fibres is new-formed connective tissue.

In the chart of temperature, table iv, notice:

M. signifies 6 o'clock in the morning.
Mi. " 12 " in the day.
Ab. " 6 " in the evening.

Since the patient was apparently better on August 15th, the temperature was only taken once, and, on the next day, only in the morning and evening.

FURTHER OBSERVATIONS ON THE HISTOLOGICAL CHANGES IN THE LABYRINTH IN HEMORRHAGIC PACHYMENINGITIS (HÆMATOMA DURÆ MATRIS.)*

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by William C. Ayres, M. D.

Susan Riednizer, born Feb. 12, 1810, widow, from Aglasterhausen. Admitted to the insane asylum on Jan. 21, 1879. Died Feb 3, 1880. Heredity not substantiated. Two of her brothers and sisters died of dropsy; a brother of tetanus, after having had convulsions. The patient had had twelve children: four died of convulsions, one five and a-half years old of croup.

The grandchildren were comparatively healthy. She menstruated at 16 years of age; often irregularly; sometimes ten to eleven weeks between. She does not remember when her periods ceased. Has had much trouble in life. She often had attacks of cramps and trembling when excited, but how long ago she does not remember. In later years she had varicose ulcers of the foot. Was married at 22, was very fat, worked hard, and was always better when she had work to perform. Never cared for company, and by industry and economy, she had had something to give to each one of her children. Was always somewhat irritable. When she had family troubles with her husband, with whom she generally lived happily, he would leave the room, returning only when she had again become rational; was always a sparing housekeeper. After the birth of one of her children, at the age of 25, she suffered for several weeks from catalepsy; she was cold and stiff, and had to be rubbed before she got over the attacks. Since

* Compare these Archives, vol. ix, part 2.

that time she had frequently jerkings in her hands. Her fingers were flexed, and the feet were likewise contracted. The attacks grew less, and have been very few and mild for about eight years; only noticed when she was very much excited. From Nov., 1877, she was sick for a long time. She had to lay in bed for seven weeks, remaining with one of her sons; since she did not agree with the stepfather of her other son. The reason was she often wished to mix herself up in the business, and made trouble with her stepdaughter. The latter would then complain to her parents, and try to settle the differences quietly. The old woman was not satisfied, thought he wished to bring her and all of her children to the house of correction, etc. She was very restless, always getting into and out of bed, and always wishing to go away. At night she would frequently go to some other house; was unsatisfied with everything and everybody. Before her sickness, and also during it, she complained very much of headache. She thought that the cramps had gone into her head, and made her crazy. For several months the eyes were stuck together in the morning. She threw things around, scratched the walls, and broke things generally. In the beginning of the month she took narcotics, would sleep nicely, but when she awoke would break things again. This continued the whole winter. As the weather grew warmer, she went into the fields to work, and seemed to feel better for it, but when the cold weather returned, and she had to remain in the house, she got worse. She was restless, thought she was persecuted, that her food was poisoned, and had her meals brought to her from the inn, and ate from her own utensils. She commenced to drink about one-eight litre schnapps, and one-fourth litre wine daily. After this the cramps went to her breast, but she thought she could always bring them away by drink, and felt better after. When she was restless, it could always be remarked that the left corner of her mouth jerked, and her tongue moved on the same side. Her head would get red, and she would look blue under the eyes. This happened frequently during her stay in Mosbach, in which place she remained for three weeks under observation, just before Christmas. When the condition of excitement was over (and they lasted only a short time) she would go off into some corner and hide herself; would frequently lock herself up for days at a time. Her family did not like to have her about them. In Mosbach she would make a great noise at night, because she was persecuted; was dissatisfied with every-

thing. Appetite good; stools irregular; constipation for two days, would be changed into diarrhœa. At present she sleeps well.

Jan. 21st.—Patient of medium statue, very lean, and looks as if she had worked hard all her life. The left side of the face is smaller, and the tongue a little projecting. Slight ptosis left; left pupil dilated. Slight emphysema without catarrh.

Jan. 23d.—Headache.

Jan. 28th.—Complained of want of breath.

Feb. 2d.—Pain in her right hand; fifth phalanx red.

Feb. 5th.—Incision; copious evacuation of pus.

March 3d.—Numerous hallucinations, especially in hearing; therefore did not wish to remain under treatment; would rather go home.

April 21st.—Pronounced ptosis left. Right pupil wider than the left. Left pupil immovable. No difference in the facial with the exception that on the right slight clonic contractions, in the region between the end of the nostril and the corner of the mouth extending inward to the medial line. Left are no contractions. Sensibility normal. Great emaciation on the palm of the left hand, and it was more marked on the back of same hand than on the left (?). Says she often feels giddy, and does not know where she is.

April 23d.—Says she hears better on the left than on the right side.

May 10th.—Badly nourished.

June 17th.—Attempt at self-strangulation.

Aug. 3d.—Felon of the middle finger of the left hand. Incision. Phlegmon of the hand followed.

Nov. 18th.—Felon of the right ring finger.

Under a badly nourished condition, her restlessness and weak condition increased. Feb. 3, 1880, she became comatose, with cold cyanotic skin of the extremities, slow pulse, and died at 7 o'clock in the evening.

Clinical diagnosis: dementia senilis.

Autopsy.—A large quantity of fluid in the subdural space of the spinal cord. Pia somewhat opaque, thickened in places, and grown together with the dura. Substance of the cord somewhat discolored in section corresponding to the posterior columns.

Skull of medium thickness; diploë abundant and congested. The sagittal sinus in its anterior segment; an ex-

ostosis in the frontal bone the size of a pea. Deep depression on its inner surface.

Longitudinal sinus empty. Dura mater thick; a thick brown coat was found corresponding to the middle groove of the skull which could be separated from the bone and ran along the temporal bone; a similar formation at the left anterior groove, but not so thick. It also extended to the posterior groove.

The pia mater also shows a yellow discoloration on the left lobe.

The pia mater of both hemispheres of the cerebrum is thick, opaque, infiltrated with serum, and is easily detached. The convolutions are wide apart, with deep depressions between them.

In the lateral ventricles more serum; the ependyma somewhat opaque; substance of the brain, of the larger ganglia, and cerebellum, soft and moist, but otherwise not considerably changed.

We omit the appearances of the rest of the body and pay attention only to the anatomical diagnosis:

Pachymeningitis hæmorrhagica. Atrophy of the brain and all its parts. Marasmus senilis. Emphysema of both lungs. Catarrhal, pneumonia of the left side. General osteoporosis.

Examination of the external and middle ear.

Right temporal bone.—External canal normal. Drum-head pale and prominent in its poterior half, with the thinnest part of the protuberance above. Atrophied with the exception of a sinuous opacity at the periphery. No pus nor mucus in the drum cavity nor in the drum membrane. Promontory (in the region of the round window, which was normal) much changed: in its middle an almost round carious spot the size of a lintel, showing a small button-like protuberance from the bone (healed caries?).

The ostium tympanicum tubæ smooth, but considerably widened, which extended like a ridge over the promontory to the region of the stapes. The whole condition was evidently the result of a long-standing purulent inflammation of the drum cavity.

Left temporal bone.—External canal free. Drum-head has a tendonous thickening in its periphery, and atrophied in its posterior half. Promontory flat and pale. Tendon of the tensor tympani very thin. All other conditions normal, especially the stapes on both sides.

Unfortunately the history of the case is defective, and we were not able to find out when the ears had suffered, nor how long the process had lasted. It is, however, remarkable that she said she heard better with the left than with the right ear.

Examination of the labyrinth.

Method.—The right temporal bone was first placed in Müller's fluid and after in alcohol, and only the porus acusticus int. its lining, and both nerves examined microscopically. The remainder was put in the pathological anatomical collection of the aural institute on account of the rare position of the caries.

The left temporal bone, after treatment with a 2-per-cent. solution of osmic acid, and decalcified according to the method given in vol. ix of these ARCHIVES, was histologically examined in all its parts.

The hemorrhages.

While in the case already described by us, it was impossible to demonstrate hemorrhages macroscopically, as Manz and Fürstner have found between the sheaths of the optic nerve in pachymeningitis, in this one a similar condition was observed. The dura mater which covered the porus acusticus int. was normal, but in the immediate vicinity of the acoustic nerve there was a bright yellow discoloration *7 mm.* in length and 1½ *mm.* broad. There was a similar condition along the lateral inferior wall of the transverse portion of the canalis facialis.[1] Microscopically they showed themselves to be caused by coagulated blood (fibrine with numerous red and white blood corpuscles) in a tissue similar to the arachnoidea; that is, a tissue composed of

[1] We found also a similar discoloration around the n. acusticus in the right porus auditor int.

fine fibres and columns covered by an epithelium of the usual form. (See Schwalbe, Nervenlehre, second edition. Structure of the brain, brain coverings, and cerebral nerves. Erlangen, 1880.) The extravasations covered the connective-tissue meshes, and filled up the spaces between them. We also found microscopic extravasations of blood between the bundles of the vestibular nerves near their exit,[1] and also more or less in the whole extent of the cochlear nerve up to its entrance into the modiolus. In the modiolus itself we could see them only in one preparation. Lastly, we found degenerated blood corpuscles between the primary nerve fibres.

Result of the hemorrhages. Pigment.

As to the method of absorption, we could only demonstrate the intercellular changes in the red blood corpuscles (Langhaus). In no preparation could we find evidence of an extra-cellular change, or even a participation of the lymph tracts in the absorption, as we saw in the cases already published.

Location—The pigment was either in the immediate vicinity of the blood-vessels or a little removed from them, also along the perineurium of the nerve bundles in the porus acust. int. or in the connective-tissue coverings of the parts of the vestibule and their adnexa, leaving the membrana propria and epithelium free. Altogether the quantity of pigment was small, both in the nerves and parts just mentioned; in the nerves it was only found between the individual fibres, while in the membranes of the vestibule only in the ampullæ and utriculus. None was found in the cochlea.

The color was black, yellowish-brown, or wine-color (red).

The form, amorphose accumulations of irregular quadrangular or round bodies and nuclei. The former were enclosed in a membrane, evidently cells containing blood corpuscles.

[1] By diffusion of the blood these extravasations appeared paler than in other places.

Condition of the blood-vessels.

In the whole region of the labyrinth [1] the blood-vessels were all full of blood irrespective of their anatomical character. The blood corpuscles in their interior were cubical or polygonal, showing evidence of stagnation. Contrary to the condition found in our other case, the form and structure of the vessels were normal. There was a great prominence of the lymph vessels in the stem of the acoustic nerve, but we were not able to determine whether it was caused by some impediment to the lymph circulation during life, or by too strong an action of the osmic acid. In no place could we find evidences of an inflammation.

Condition of the Nerves and the Membranous Labyrinth.

The structure of the body of the nerves and their expansion in the cochlea were normal, also the soft parts of the vestibule and its adnexa, the soft parts of the cochlea, even the lamina basilar, membrane, and organ of Corti.

We could also remark that we found the phosphate of lime concretions of Böttcher, not only in their usual places in the porus, acusticus int., but also in the periosteum of the canali facial, in the aqueductus cochlea, and also in the jugular foramen (unfortunately we could not examine the aqued. vestib.).

Remarks—If we compare our present case with that published by us before, we find that they both show the same anatomical-pathological condition within the brain cavity. They are different in that in the first case the disease had lasted much longer and the attacks were more frequent (as shown by the autopsy, since the contents of the hæmatoma had degenerated to a serous fluid, and the sac had many layers), while in our *post-mortem* we found only a thick coating, which was evidently a recent product, and may have been produced by a single hemorrhage in the dura mater. From this macroscopic change in the skull cavity, we can also account for the microscopic condition of the labyrinth.

[1] Also those of the normal mucous membrane of the promontory were filled with blood corpuscles in the same state.

In the first case we could see macroscopic hemorrhages nowhere in the labyrinth, while these were frequent in our case. Corresponding to the oft-repeated hemorrhages in the first case, we were able to find pigment degeneration of blood extravasation *in all parts of the labyrinth*, while in our case, since there was probably only one hemorrhage, we found slight and isolated pigment metamorphoses. We must call special attention to the extensive degenerations of the blood-vessels of the labyrinth in the first case. There were cell infiltrations of the walls, thickenings, dilatations, and even obliterations, while in the present case the vessels were normal.

If we hereafter coroborate this normal condition of the blood-vessels in cases of recent hemorrhage in the dura, we must conclude that the changes in the vessels described in the first case were secondary, and that the hemorrhages in the labyrinth depended upon a disturbance of circulation brought about by the disease within the skull cavity. On account of the mildness and duration of the disease in this case, an inflammation could not have been set up in the labyrinth severe enough to bring about atrophy and other degenerations, and consequently we find all of its parts normal.

It shows us also that those changes in the labyrinth which are caused by one single hemorrhage in the dura, can be restored to the normal (total absorption of pigment with no results of inflammation), and also functional disturbance disappear. For the practitioner, this is of particular interest, since it demonstrates that hæmatoma of the dura mater is curable (Griesinger, Hasse, and others).

As to the clinical symptoms, and especially the vertigo and hallucinations in hearing, even if we wish to consider that a patient can suffer so much from one single hemorrhage in the dura, we are by no means willing to concede that such slight disturbances as we have found in the labyrinth could bring about such symptoms.

The differences in hearing on the two sides must be explained by the conditions of the middle ear, but we were unable to obtain a history of the cause or course of the middle ear disease.

A PECULIAR CONDITION OF THE PAVEMENT EPITHELIUM OF THE ENDOLYMPHATIC CAVITIES IN MAN.

By H. STEINBRÜGGE, of Heidelberg.

Translated by William C. Ayres, M.D.

(*With table iv, fig.* 5.)

THE membranous semicircular canal, the ampullæ, the utriculus, and sacculus, show a single layer of pavement epithelium with large round nuclei in those parts free from nerves. In the vicinity of the entrance of the nerve these cells are cuboid, and gradually change to cylindrical forms.

In our examination of the labyrinth, Moos and myself have found that in preparations treated with osmic acid, besides the homogeneous nuclei in the cells of this pavement epithelium, there are other formations composed of many small bodies with dark edges, which refract light strongly. They were either arranged in spherical groups, in irregular figures, or scattered about. Sometimes they were near the nucleus and encircled it, but frequently they were crowded into one corner of the cell polygon.

We were first inclined to consider them as an expression of some pathological process, and similar to fat-globules which are found in inflammations. However, in comparing them with the ears of persons who have never suffered from ear difficulties during life, we found that they were also present in normal ears.

The condition then became of some interest, when I found that the ductus cochlearis was also lined with pave-

ment cells containing similar little bodies. After making section through the cochlea, parallel to the long axis of the modiolus, I obtained a preparation which included a very small part of the third convolution, so that the epithelium could be seen from the surface, and the cells also showed the small bodies referred to.

Later they were found in other convolutions, and also on inner surface of Reissner's membrane, on the zona pectinata (see fig. 5, *a* and *b*), and ligament. spirale where it belonged to the ductus cochlearis,[1] neither exterior to the ductus cochlearis, nor within the scala tympani. They do not exist in the perilymphatic region.

We must, therefore, consider them as peculiar to the epithelium of the endolymphatic spaces, with the exception of the recessus labyrinthi whose epithelium is composed of small cells with large oval nuclei lying close together. In these they do not appear.

As to the form of the polygonal cells and their nuclei we can notice but little variety in the different parts of the endolymphatic spaces. In the cochlear we find only round nuclei with very regular circular contours, 0.005 *mm.* in diameter. The accumulation of the small bodies is about the same size as these nuclei as long as they are arranged in spheres. The nuclei show also a peculiar lustre, the same as we notice in the cells at the feet of the rods of Corti, and also in the nuclei of the external hair cells. In the semicircular canals and utriculus we notice many bean-shaped nuclei (fig. 5, *c* and *d*) by the side of triangular ones. In the sacculus we find round nuclei 0.007–0.01 *mm.* in diameter. There may be individual differences in shape depending upon some condition of pressure.

With these facts the object of this communication has been reached, that is, if in the smallest degree it renders the examination of the normal and pathological labyrinth easier. We may, however, remark that these little bodies only occur in the endolymphatic region, and it may be im-

[1] In profile, or where they belong to vertical sections, we can not demonstrate them, surface preparations of the membrana basilaris being preferable. The best are the first sections upon a convolution of the cochlear going from the vestibule. Strong osmic acid renders the examination easier.

agined that they may indicate some chemical change within the nucleus or cell body, furnishing some peculiarity of the endolymph, as in the epithelium of lymph glands. Even if the greatest part of the endolymph is produced by a transudation from the walls of the blood-vessels, or from the lymph spaces which accompany them (as we frequently see the small bodies resembling lymph cells on the superior surface of the nerve epithelium in the ampullæ), it may be that the pavement epithelium and also the cells of the recessus labyrinthi may have some effect upon the endolymph by a change of their contents, since they serve as a filter in the transudation and secretion of a similar material.

We know but little as to the chemical examination of the peri- and endolymph, and we must consider this only as a suggestion concerning these questionable substances.

Hagen[1] has furnished us a few analyses of serum from the external canal, which was collected after injuries of the head, complicated with fractures of the pyramid and tearing of the dura mater, and also of some only implicating the walls of the labyrinth. In the first, there was liquor cerebrospinalis; and in the second, fluid from the labyrinth.

While the former contained only traces of albumen, the latter had more of it, with a small admixture of chloride of sodium. Of course, we cannot determine, in such cases, whether we have peri- or endolymph or both mixed together. If we compare his results with those of Dänhardt,[2] which were derived from the codfish, the larger quantity of albumen must have come from the perilymph, as the endolymph, according to him, contains only traces of it. According to Dänhardt and others, notwithstanding the thinness of the membrane which separates them, only a slight diffusion takes place from the one to the other. Besides these peculiarities, both fluids are alkaline and contain mucin, chloride of sodium, and traces of sulphate and phosphate of lime.

If we wish to associate the presence of the little bodies with these conditions, the chalk would certainly have some

[1] The serous exudation from the external ear after injuries of the head. Dr. R. Hagen, Leipzig, 1866.

[2] Endolymph and perilymph. By Dr. med. Dänhardt, from the Physiological Institute in Kiel, 1868, p. 103.

relation to them. The formation of the otoliths must have its origin in a separation of chalk, which may not be present in such small quantities as the analyses seem to indicate.

The deposit of phosphate of lime, which happens so frequently in the region of the acoustic nerve and within the coverings of the aqueducts, seems to indicate a disposition of the soft parts in the interior of the pyramid of the temporal bone to form chalky deposits.

On account of the reaction to osmic acid, we may suppose that these small bodies, before mentioned, have some relation to fat, but we must supplement this opinion until we have decisive evidence of the presence of fat in the endolymph of the human ear.

As to the place of formation, the evidence is that they are produced within the nucleus and not in the protoplasm of the cells. Many nuclei seem to have lost their homogeneous condition and become finely granular, and in many cells only the small globules were present. In all probability a continuous destruction and regeneration of nuclei and cells occurs, though in a manner hitherto unexplained, for nowhere could I demonstrate a division of nuclei which Fleming describes as indirect nuclear division, and the occurrence of which might be expected from the ectodermal origin of these epithelial cells.

Explanation of Figures.

Fig. 5. *a* and *b*. Epithelial cells from the second convolution of the cochlea. *c* and *d*. Epithelial cells from a membranous semicircular canal. *e*. Epithelial cells from the utriculus.

EPISTAXIS, PLUGGING OF THE NARES, AND THEIR RELATIONS TO AFFECTIONS OF THE ORGAN OF HEARING.

By ARTHUR HARTMANN, of Berlin.

Translated by Isidor Furst, of New York.

IN submitting my experience with epistaxis to a discussion in the present paper, I do so, because I gather from the literature before me that many observed facts have not been sufficiently heeded, and that many relations have not been thoroughly elucidated.

The views which I have gained I would summarize thus:

1. The majority of spontaneous nasal hemorrhages spring from the anterior part of the nasal cavity, either from the septum or from the floor of the nares.

2. It is always possible either to find the bleeding spot or at least to determine from which part of the nose the hemorrhage flows.

3. To stop the hemorrhage it suffices, if the bleeding spot has been found, to press a small pledget of cotton upon it. If it be only possible to determine from which part of the nares the hemorrhage sprang, it suffices to plug the nasal meatus firmly with cotton.

4. By this partial tamponade directly applied to the bleeding spot, the hemorrhage is more certainly arrested, and in a manner less disagreeable to the patient, than by the anterior and posterior nasal tamponade, or by the filling of the entire nasal cavity.

5. By the posterior nasal tamponade, with or without employment of liquor ferri sesquichloridi, violent inflammations of the middle ear are not infrequently produced.

It is customary to distinguish two forms of spontaneous epistaxis: the *active* form referable to congestive, and the *passive* form referable to stasis, hyperæmia. Aside from the fact that this distinction cannot be applied to all cases, it appears to me more important, practically, to found the division, in the first place, upon the morbid dispositions which favor the occurrence, especially of the frequently-repeated, habitual epistaxis. The most important form of epistaxis, which, for simplicity's sake, we designate as dyscratic, is that in which we assume an *abnormal friability of the vessel walls*, which perhaps is connected with a decreased coagulability of the blood. Such conditions, we find particularly, in young, delicate individuals with pale complexion who have a phthisical tendency. While, in these, epistaxes are not rare up to the time of puberty, later, the far more dangerous hæmoptyses take their place. Furthermore, we have as belonging to this group, the tendency to epistaxis in weakened organisms, after grave diseases, in cachexiæ, in scorbutus, in malaria. This form of epistaxis exerts a very unfavorable influence upon the vigor of those suffering from it, and thereby the disposition to the repetition of the hemorrhage is favored.

Less grave are the hemorrhages which occur in vigorous persons of full habit, whom we designate as plethoric. These prove in many cases even of beneficial influence, and we must abstain from interfering with them. The hemorrhages may ensue both in acute and in chronic plethora, when large quantities of fluids are drunk, and by their absorption into the vascular system the lateral pressure in the vessels is increased; or, in chronic plethora when this pressure is permanently increased.

In both categories of patients, the disposition being present, the immediate inclination to the hemorrhage may be caused by congestion of the head, and the hemorrhage may be produced by all the influences which may incite that condition. In plethoric individuals particularly, not

rarely signs of cerebral congestion precede epistaxis,—pressure and oppression in the head, headache, vertigo. With the onset of an abundant hemorrhage, these phenomena disappear.

Furthermore, we must here mention the cases in which *mechanical obstacles prevent the flow of blood* from the superior vena cava to the right heart, and the stasis in the veins of the pituitary membrane favors their rupture. This is especially the case in diseases of the lungs and heart.

The epistaxes which are produced by *traumatic* causes seldom take on a threatening character; more frequently in injuries to the vessels caused by operative manipulations in the nose, the hemorrhages must be arrested by artificial means in order to avoid dangerous loss of blood.

Of importance are also the *epistaxes* which are found in *malignant neoplasms and ulcerative processes.* The former are generally unimportant, but occur very frequently; more or less blood being present in nearly all the discharged secretions. More profuse hemorrhages occur in ulcerative processes, in scrofulous, tuberculous, syphilitic ulcers, when the vessels become eroded.

The occurrence of hemorrhages from the nose as a *vicarious menstruation*, is designated as *vicarious epistaxis.*

Of the greatest rarity are cases of *intermitting epistaxis*, in which the hemorrhages occur at regular intervals, usually daily. These cases must be attributed to malaria, and can be cured by appropriate treatment.

Besides the cases of epistaxis just discussed, there is still another series, in which we can find no cause for the occurrence of the bleeding, and I believe these are the more frequent and more dangerous cases. Persons otherwise in perfect health, without any direct cause, are attacked by violent epistaxis, which is repeated after longer or shorter intervals, and which may become dangerous through the quantity of the blood lost.

Origin of the Hemorrhages.

The question of especial importance as regards treatment —from which parts of the nose the most violent, the most

threatening hemorrhages spring—has not yet been satisfactorily answered, and the reported observations are still scanty. Little[1] states that in four cases he found erosions upon the septum narium, close behind the meatus. Of two hemorrhages reported by Michel,[2] one sprang from a part of the septum, exactly above the anterior end of the inferior turbinated bone. The other hemorrhage originated quite in front at the entrance to the osseous naris, close above the floor, on the septum. In a case of epistaxis from both nostrils, I succeeded in discovering as the source of the hemorrhage two spots, likewise upon the anterior part of the vomer, situated symmetrically on both sides, which showed an irregular, excoriated surface contrasting with the otherwise quite smooth mucous membrane. Another hemorrhage which I had the opportunity of examining during its progress also issued from the anterior part of the septum. In two other profuse hemorrhages, I found the bleeding spot at the transition of the vomer into the floor of the naris. In still another fifth case the floor of the naris gave origin to the epistaxis. From this experience had by others and myself, I believe myself justified in drawing the conclusion that *the vomer and the floor of the naris pre-eminently participate in spontaneous epistaxes, and that the turbinated bones* with their cavernous tissue *rarely give origin to them.* As the mucous membrane of the septum and of the floor of the naris, is firmly attached to the underlying bone, it appears probable that the hemorrhages which take place from the vessels coming to the surface out of the bone, as well as those from the bone itself, are stopped with difficulty, because these vessels are surrounded by unyielding tissue which prevents their contraction, and that the intractability of these hemorrhages is due to this circumstance.

In isolated cases, these epistaxes might be caused by circumscribed dilatations of the vessels in some parts of the Schneiderian membrane, which, being liable to break by the slightest circumstance, give rise to the profuse hemorrhage.

[1] *Hosp. Gazette.*

[2] Die Krankheiten der Nasenhöhle und des Nasenrachenraumes, Berlin, 1876, p. 71.

In favor of the occurrence of such places we have the observation of Voltolini,[1] who, on examining a patient suffering for six months from profuse epistaxes, found a teleangiectatic proliferation "deep in the nose" (the precise spot is not given), which he destroyed by the galvano-cautery, and thus permanently cured the trouble.

Diagnosis of the Point of Origin of the Hemorrhages.

In order to detect the source of the epistaxis, it is necessary, in the first place, to thoroughly dilate the nostril from which the blood is flowing, with some one of the usual specula,[2] and to illuminate the cavity well by the frontal reflector. The fluid and coagulated blood present having been removed by blowing the nose or by irrigation, a plug of cotton is introduced into the lower meatus with the bent tweezers, for the purpose of absorbing the blood still covering the surface of the mucous membrane. If the source of the hemorrhage is not found here, the middle meatus is treated in the same manner. In most cases the bleeding spot will then at once be seen, particularly if it is situated in the anterior part of the nose, which, as we have seen, seems to be most frequently the case. If the hemorrhage is more deeply situated, or, if profuse, and the surface of the mucous membrane is, immediately after the removal of the cleansing tampon, again covered with blood, a more systematic manipulation is required. In these cases I first remove the blood from the middle meatus; if thereafter it remains free from blood, it follows that the hemorrhage springs from the lower meatus; if, however, the mucous surface is quickly again covered with blood, the source of the hemorrhage must be sought in the upper part of the nose. During these examinations it is necessary to proceed as rapidly as possible, so that the inspection may be made immediately after the wiping. In order to prevent the subsequent flow of blood from hindering the examination, the

[1] *Monatschr. f. Ohrenheilk.*, Bd. xi, p. 51.

[2] For this purpose I employ an instrument named after Kramer; it is bivalved, resembles the otoscope, and is provided with a dilating mechanism. It appears to me to have many advantages over Duplay's speculum, which is ordinarily much used.

patient is directed to inspire abruptly with closed mouth, whereby the blood is made to course backward instead of forward. Whether the bleeding spot will be found in the more posteriorly situated regions depends on the width of the naris and the profuseness of the hemorrhage. If the spot cannot be found, it suffices to know from which nostril the hemorrhage springs, and whether from the anterior or posterior part of the nose.

A view differing from those just described is expressed by B. Fränkel,[1] who thinks that in many cases great difficulty is experienced in determining whether the hemorrhage springs from the naso-pharyngeal space, or from the posterior or other parts of the nose. "In the more violent hemorrhages it is nearly always impossible, on account of the blood quite inundating the field of view, to perform rhinoscopy, or to determine the bleeding spot by inspection from in front."

Should the patients come under observation after the epistaxis has ceased, there are frequently no indications for determining the source of the hemorrhage. If but a short time have elapsed since the epistaxis, black coagula are found, after the loosening of which by the probe the flow commences afresh. Michel, in one case, found only a punctiform particle of coagulated blood, and when it was touched with the probe profuse hemorrhage immediately ensued. I observed in two cases a like condition. The parts around these spots are perfectly normal. After the coagulum is removed, either an entirely smooth mucous membrane is seen, or the spot from which the blood issued is revealed as a minute depression.

Arrest of the Hemorrhage.

The number of agents by which epistaxes may be arrested is exceedingly large—the application of cold in various forms, and the most widely differing astringent and styptic agents; among the latter, especially liquor ferri sesquichloridi, of which I shall speak further on. A great

[1] V. Ziemssen's *Handbuch der spec. Pathologie und Therapie*, Bd. iv, p. 148.

number of hemorrhages can be stilled by these more simple means; but there still remain many grave epistaxes in which they prove futile, and as the most reliable means for arresting these, plugging of the nares is generally employed.

Inasmuch as every hemorrhage is most certainly arrested by searching out the bleeding vessel, and applying our means to act directly upon it, this principle will likewise have to be extended to epistaxes; in every case the source of the hemorrhage must be looked for and directly operated upon.

According to my experience, it is sufficient for the arrest of all epistaxes to press a tampon of ordinary von Bruns' cotton for several minutes upon the bleeding spot, and to let it remain for twenty-four hours. In this manner I succeeded, under the most adverse circumstances, on a *canal boat*, by the flickering light of a petroleum lamp, to immediately arrest a hemorrhage in a man suffering from malaria, which had continued for two days, and had produced a condition of extreme anæmia. Solution of chloride of iron and other means had already been employed in vain. Although, on attempting to cleanse the nares with tampons of cotton, the hemorrhage flowed still more profusely, I yet succeeded in locating its source on the floor of the naris. I then introduced a pledget of cotton the size of a hazelnut, pressed it with a thick probe against the floor of the naris, and the flow immediately ceased. The next day the tampon was removed without the recurrence of the epistaxis. In a similar manner I succeeded in several other cases, in which the hemorrhage sprang from the anterior part of the nose. In epistaxes, from the anterior upper part of the septum, which are not rare, it sometimes suffices to push a small tampon behind the dorsum nasi, and to press it from without through the ala against the septum in order to arrest the flow at once.

If the bleeding spot has not been found during the examination, but only that part of the nose from which the epistaxis sprang, a piece of cotton dressing is so formed and compressed as to make a cylinder of 3 to 5 *cm.* in length,

the thickness ranging from that of a lead pencil to the little finger. This cylinder is to be inserted into the respective nostril with the tweezers, after the removal of which it is to be put in place with the probe. If the lower meatus is to be tamponed, a thick probe is to be pushed up above the cylinder, by which it is pressed against the floor of the naris, and, according to circumstances, either more toward the outer or inner wall of the passage. If the upper passage is to be plugged, the tampon is to be brought into it, and the probe pushed up below the cotton cylinder, which is to be pressed upward or outward. If one cylinder is insufficient to fill the passage, a second one is inserted in the same manner. If the naris is very wide, or the concha is far apart from the septum, the cylinders can also be inserted from the lower into the upper duct, and *vice versa*. The same is required when the septum is crooked, or when the lower turbinated bone projects strongly in some places; the tampon introduced above the constricted spot must be pressed downward behind it.

In most cases it suffices to arrest the hemorrhage, and no other measures are required. In order to prepare them for the recurrence of the flow, I instruct the patients how to introduce a tampon into the nose, recommending them to insert a small tampon of appropriate size, the tip of the nose being pressed upward, as straight as possible backward into the passage from which the blood issues, if need be with the aid of the tweezers, or a knitting-needle, and then to press the tampon—in hemorrhages from the anterior part of the septum—against it by pressure upon the ala; or, in those from the floor of the naris, to press the tampon downward from above with the closed tweezers or the knitting-needle. Besides, astringent solutions or solutions of chlorate of potash are ordered for the after-treatment. In habitual forms of epistaxis, constitutional anomalies must be regarded in the first place; secondly, pathological alterations possibly present in the nose have to be removed. The spot from which the blood issues should be destroyed by the galvano-cautery, so that a firm cicatrix be formed. Care must be had that red heat only is

employed, because with white heat the scab is torn off when the cautery is removed, and thus fresh hemorrhage is likely to occur.

Most authors who have treated of epistaxis in text-books of surgery or in special treatises, confine themselves to the description of the anterior and posterior nasal tamponade. Besides, the application of the rhineurynter is always fully discussed,—an instrument described as early as 1839 by Velpeau, after Martin Saint-Ange, and recently rediscovered by Küchenmeister[1] and drawn from its well-merited oblivion.

In English literature particularly, nearly every year clinical cases of epistaxis are reported, and the most heterogeneous medicaments are recommended. From among these communications I shall only specify the procedure described by Hamilton,[2] which consists in filling the entire half of the nose from which the hemorrhage issues, with strips of lint. The employment of this procedure may be particularly recommended to those who are less familiar with the examination of the nose, and who are not supplied with the instruments necessary for the partial tamponade.

Advantages of the Partial Nasal Tamponade.

As in the above-described mode of plugging the dressing cotton is pressed upon the actual bleeding spot, the hemorrhage is most certainly arrested. At least, I always succeeded in immediately stilling the flow in this manner; in but a single case, to be mentioned below, of artificial hemorrhage, I was obliged, by the seat of the bleeding spot, to perform the posterior tamponade.

Moreover, this method is the most agreeable to the patient, as there are none of the troublesome phenomena connected with the posterior nasal tamponade and the application of chloride of iron. In the posterior tamponade, the mere presence of the tampon in the naso-pharyngeal space is most distasteful to the patient, not to speak of the

[1] *Oesterreichische Zeitschr. f. pract. Heilk.*, No. 22, 1871.

[2] *Brit. Med. Journ.*, May 8, 1880.

thread led outward through the mouth. The complete plugging prevents the discharge of the nasal secretions, great irritation of the mucous membrane ensues, and the passage of air is effectually prevented—evils not connected with the partial tamponade. After complete plugging of the nose (anterior and posterior tamponade) Bardeleben[1] twice observed blood issuing from the lachrymal ducts, without any evil effects, however, since it remained in the lachrymal apparatus.

As regards the employment of solution of chloride of iron, it is in universal use; for instance, the author of the section on epistaxis, in the just issued Real-Encyclopædie by Eulenburg (Nos. 41 and 42), in discussing the nasal tamponade, thus expresses himself respecting the saturation of the tampon with styptic fluids, especially with liquor ferri sesquichloridi: "Little can be said against it," without mentioning what objections could be made to its use. I, however, feel called upon to emphasize the fact that the drug produces great irritation in the mucous membrane, that it causes pain and subsequent inflammation. As a tampon soaked in solution of chloride of iron enters into firm connection with the underlying structures, a fresh hemorrhage is frequently produced by its removal, while the ordinary dressing cotton, directly applied, absorbs moisture, and is therefore more easily separated from the underlying tissue.

The ill effects which may be produced upon the auditory organ, by the nasal tamponade, especially when performed with solution of chloride of iron, have not hitherto been mentioned.

Acute Inflammation of the Middle Ear A Sequel of the Posterior Nasal Tamponade.

After performing the posterior nasal tamponade, with or without solution of chloride of iron, not infrequently violent inflammations of the middle ear occur, which are either caused by the inflammation set up by the acting irritation being propagated to the mucous membrane of the tubes, and from there to the middle ear, or perhaps by the en-

[1] *Lehrbuch der Chirurgie*, Bd. iii, p. 199.

trance of some of the iron solution into the drum cavity, thus lighting up the inflammation.

The first case which came under my observation, occurred in a woman who was under my treatment for chronic otorrhœa conjoined with complete destruction of the membrana tympani. The history showed that the posterior nasal tamponade had been performed upon the patient on account of a very profuse hemorrhage from the nose. By the next day a pricking sensation was felt in the ear, which rapidly changed into violent pain. The inflammation became so great that the patient had to be treated for four weeks in one of our hospitals, suffering from high fever and most severe pains in the ear and head. Upon examination, several weeks after the otitis had run its course, I found the naris very wide, about as in ozæna; the entire inner surface of the nose, of the naso-pharyngeal space, and the openings of the tubes, could be seen.

Under these circumstances it certainly would have been possible to find the source of the epistaxis, and to arrest it in the above-described manner, thus saving the patient the grave otitis, and the consequent greatly impaired hearing.

A second case of severe otitis media, with transient cerebral symptoms, incited by the posterior nasal tamponade, occurred in a brother physician, X. Without demonstrable cause, very violent epistaxis from both nostrils had set in; the ordinary hæmostatics, such as ice, vinegar, tampons of chloride of iron, having failed, bilateral posterior tamponade, without employment of solution of chloride of iron, was performed at one of our hospitals. Three days after the tamponade, when I saw the patient, violent pains in the left ear had commenced, the membrana tympani appeared blue-black, as in effusions of blood; at its lower part was a small accumulation of dark blood with pulsating light reflex. In the next few days a serous, later a sero-purulent, discharge began from the ear. The pains were especially severe at night, with high fever and temperature above 40° R. On the fourth day of the affection, there occurred, together with a sensation of cerebral hyperæmia, intense vertigo, violent vomiting, mental hebetude, and loss of appetite. Temperature moderately increased to 38.2° R.; pulse normal. Ice bladder to the head. These cerebral symptoms again vanished during the next few days. The ear-

ache likewise soon decreased ; particularly after each employment of Politzer's experiment with slight pressure an improvement was always apparent. The hearing, at first much reduced, also quickly improved. On the twelfth day of the affection, after an error in diet, a relapse of the pains with diminished hearing occurred, but the application of three leeches soon caused the exacerbation to yield. Improvement progressed rapidly thereafter. Cure with complete restoration of hearing.

The hemorrhages in this case had sprung from the anterior part of the vomer, on both sides of which existed, at the height of the inferior turbinated bones, the above-mentioned excoriated spots, with irregular surface. After the first severe epistaxis had been arrested, fresh hemorrhages repeatedly recurred, but they were always speedily stilled by the patient inserting a plug of cotton into that part of the nose, and exerting pressure from without upon the bleeding spots. A careful examination of the nares during the first hemorrhage would certainly have discovered the source, and it might have been arrested in the same simple manner, thus obviating the posterior tamponade with its attending severe otitis media.

In a third case I observed violent otitis media after artificial hemorrhage, *i. e.*, occurring after an operation in the nose, which I had arrested by the posterior tamponade.

The case occurred in a patient who had placed himself under my treatment for chronic coryza, with occlusion of the nose. Examination showed bilateral, diffuse, polypoid hypertrophy of the inferior turbinated bones, thus completely occluding the lower meatuses. On rhinoscopic examination, both choana were to a great extent likewise found filled with swellings. I began to remove the tumors of the inferior turbinated bone from the anterior nares, partly with the hot, partly with the cold wire snare. After I had completed the removal of the neoplasms in the anterior part of the nose, I discovered on the left, in the most posterior part of the nose, a polypus of about the size of a hazel-nut, which filled the choanon, and could easily be moved to and fro with the sound. The space was too narrow for the double tubes of the galvano-caustic snare ; I therefore seized the cold wire, and with it removed the polypus. After that air could freely pass through that part of the nose, and the rhinoscopic examination proved

that the polypus had originated from the posterior end of the middle turbinated bone. After its removal a moderate hemorrhage ensued, which was controlled by the insertion of a plug of cotton into the middle meatus. In the evening I was called with the message that there was continual hemorrhage. I found on examination that the blood was steadily trickling down from the naso-pharyngeal space into the lower part of the pharynx. As the patient lived in a remote part of the city, my aim was to stop the hemorrhage positively for the night, and I therefore resorted to the posterior tamponade,[1] dipping the plug into a saucer of water to which I had added a few drops of liquor ferri sesquichloridi. The tampon being applied directly to the bleeding spot, the hemorrhage ceased at once. The plug was removed the following noon. At this time already the patient noticed a stinging sensation in the ear, and examination showed slight injection of the vessels of the drum-head. The symptoms thereafter rapidly increased in severity, and a very violent otitis media developed, which I at first tried to limit by the application of cold and three leeches. I was compelled to perform paracentesis of the membrana tympani, with but little effect; the application of hot sponges, however, proved very advantageous, they alone being able to quiet the severe pains. While the otitis media was running a favorable course, erysipelas set in at the leech bite, and migrated over the whole head; it was accompanied by high fever and other grave disturbances, but terminated favorably.

On summarizing the above observations, we may say, as regards the arrest of the hemorrhage in the first two cases, that the posterior tamponade might have been avoided, while that could hardly be done in the last case. In all cases the posterior tamponade produced severe inflammation of the middle ear.

From my experience I believe myself justified in drawing the conclusion, *that the posterior tamponade should be avoided, if the seat of the hemorrhage makes this possible, and especially should the application of liquor ferri sesquichloridi be eschewed.*

[1] The tamponade was performed with the aid of an aural catheter, through which a loop of steel wire was pushed. When the loop appeared under the velum palati, it was seized with the dressing forceps, and drawn outward. The thread end of the tampon was then brought into the snare, and with it was drawn through the nose, then the tampon was brought into the naso-pharyngeal space by the thread. This procedure appears to me simpler than the employment of Bellocq's canula.

AN ABSTRACT OF THE PAPERS ON OTOLOGY

READ BEFORE THE SECTION OF OPHTHALMOLOGY, OTOLOGY, AND LARYNGOLOGY, AT THE 32D MEETING OF THE AMERICAN MEDICAL ASSOCIATION, HELD AT RICHMOND, VA., MAY 4, 5, AND 6, 1881.

By SWAN M. BURNETT, of Washington.

In a paper on the *radical cure of nasal catarrh* Dr. W. C. Jarvis, of N. Y., related two cases in which great impairment of hearing was relieved by the instrumental removal of hypertrophied tissue of the turbinated bones. In one case the hearing was reported to be completely restored, although there was no direct treatment to the ear.

Dr. J. A. White, of Richmond, had used Dr. Jarvis' instrument several times, and had found in some cases marked improvement in hearing after the relief of the anterior nasal troubles. In one case there was on one side no discoverable organic change in the *Mt.* or drum cavity after five years of disease, though there had been much impairment of hearing.

Dr. W. H. Daly, of Pittsburgh, had often found the hearing improved after the removal of nasal hypertrophies, and where there had been no direct treatment of the ear. To these hypertrophies he had sometimes applied the galvano-cautery by passing the electrode heated to a cherry-red over the growths. He had also used glacial acetic acid, applied to the base of the growths, with good effect.

In reply to a question Dr. Jarvis said he thought the trouble in the vault and pharynx in such cases secondary to the anterior nasal disease.

Dr. Risley, of Phila., had been struck with the frequent connection between nasal and aural diseases. He called particular

attention to deflection of the vomer as a cause of aural disease. He had not found it necessary to operate in such cases, but had treated them topically with iodoform and alum.

Dr. LITTLE, of Phila., called attention to the influence of nasal troubles on the lachrymal apparatus.

Dr. REYNOLDS spoke of the predisposing and constitutional causes of nasal affections.

Dr. CHISOLM, of Baltimore, described a *twitching of the tensor tympani muscle causing an annoying tinnitus*, as he had observed it in his own person. It was confined to the right ear, and consisted of a note rapidly and rhythmically repeating itself with perceptible intermissions between each individual sound. He found by experiment that he could produce the subjective sound, at that particular time, at will, by taking claret at dinner. Valsalva's method of inflation, Politzer's, and the throwing of chloroform vapor into the drum cavity, had no influence on the noise. Hearing power not influenced in any way. He has since seen two other cases. He considers them all due to a twitching of the tensor tympani muscle.

Dr. S. M. BURNETT, of Washington, called attention to a recently published case by Gottstein in which subjective noises were associated with spasm of the orbicularis, and which were referred to associated spasm of the stapedius. In this connection he wished to call attention to a physiological phenomenon which he had been observing for some years. He noticed that at times when he made a vigorous contraction of the orbicularis there was at the same time observed a roaring in the ears. He had found the best time for making the experiment to be in the morning immediately after waking.

After making three or four vigorous contractions of the orbicularis, the phenomenon ceased. He was in doubt whether to refer it to the noise of the muscular contraction conveyed to the auditory nerve through the cranial bones, or to a simultaneous contraction of one of the two intra-aural muscles. As this noise was exactly similar in character to that caused by muscular contraction in other parts of the face, especially the muscles of the lower jaw, he was inclined to refer it to this source.

QUARTERLY ABSTRACT OF AMERICAN OTOLOGICAL LITERATURE.

By Dr. SWAN M. BURNETT, of Washington.

1. On the metastasis of inflammations from the ear to the brain. By J. A. Andrews. *New York Med. Jour.*, February and March.

An elaborate consideration of the subject, giving a *résumé* of our knowledge of such inflammations as gleaned from the literature of the question. No original observations are given.

2. Nasal, post-nasal, supra-post-nasal and pharyngeal inflammations, considered with reference to diseases of the middle ear. With remarks upon treatment. By C. S. Turnbull. *Med. and Surg. Rep.*, Feb. 19th.

3. Foreign bodies in the ear. By C. H. Burnett. *Amer. Specialist*, March 1st.

B. thinks that, as a rule, foreign bodies in the ear do less harm than the unskilful efforts to extract them. He still clings to the syringe as the safest and best means for removing the majority of foreign bodies which find their way into the ear.

4. Malarial otitis. By F. C. Hotz. *Amer. Specialist*, March 1st.

H. records another case of otitis intermittens which showed in a remarkable manner the intolerance of the ear to any local application, even gentle injection of warm water producing a fainting fit. Cured by quinia.

5. Perichondritis auricular. Thos. R. Pooley. *N. Y. Med. Record*, March 19th.

P. relates a case of this affection which bears a close resemblance to the one reported by Dr. Knapp in vol. ix, No. 3 of these Archives.

REPORT ON THE PROGRESS OF OTOLOGY DURING THE SECOND HALF OF THE YEAR 1880.

(CONCLUSION.)

Translated by Dr. Richard C. BRANDEIS, New York.

I.—PHYSIOLOGY OF THE EAR AND PHYSIOLOGICAL ACOUSTICS.

BY OSCAR WOLF, FRANKFORT-ON-THE-MAIN.

1. A. BOCKENDAHL, Kiel. The movements of the tensor tympani muscle as observed in the dog. *Archiv f. Ohrenh.*, vol. xvi, part 4.

2. ALEXANDER GRAHAM BELL. The photophone. Address delivered before the American Association for the Advancement of Science. Boston.

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1. BOCKENDAHL has continued the experiments begun by Hensen for the purpose of determining the functions of the tensor tympani muscle. As Hensen has proved that the tensor tympani contracts at the beginning of a tone, sound, or syllable, Bockendahl set to work to find a method to determine exactly the dimensions of the muscular movements as well as the influence of the variations in pitch and intensity of tones, and their mode of action upon the membrana tympani.

Hensen, as is well known, after exposing the tympanic cavity of a cat or dog, inserted a needle into the belly of the muscle, and then allowed different tones to reach the membrane. In order to determine how great the excursion was which was due to a contraction of all the muscular fibres, Bockendahl attached instru-

ments, which could register these movements, to the osseous insertion of the muscle, or at least to its tendon.

We first find a description of the manner of opening the tympanic cavity of the dog from the *bulla ossea*. This is a rather difficult and complicated operation, the details of which can best be found in the original paper. It need only be said that the skin is incised in a line parallel with the lower maxilla, and equidistant from the angle of the lower jaw and the transverse process of the first cervical vertebra. The construction of the tympanum, which differs somewhat from that of the human subject, is discussed in detail.

The diminutive size of the parts, when compared with the instruments employed, gave rise to some difficulties during the experiments. The attempt to reach the muscle from within (through the trephined opening) in such a manner that the needle inserted into it had sufficient play to make the necessary movements, was not successful. After making vain attempts upon sixteen dogs, the experimenter determined to pass the needle into the body of the malleus, through the external meatus and the tympanic membrane, after removing the bony portion of the meatus. This proceeding has the advantage that the tympanic cavity need not be exposed. The body of the malleus, the manubrium, and the muscle, which is strongly developed in the dog, can now be seen through the membrane. The excursions made by the needle, which was bored into the malleus, were duly noted by means of the corneal microscope, which was brought to bear upon it; the length of the movements was determined by the ocular micrometer. Organ pipes, reed instruments, Hipp's apparatus, etc., were used for the production of sounds. The experiments showed, as was also Hensen's experience, that the excursions of the needle were in direct ratio with the pitch of the tones; the higher the pitch, the greater the vibrations. As the pitch of the tones diminished, the vibrations of the needle generally became less. Bockendahl determines the limits of sounds heard with implication of the tensor tympani muscle as ranging between 144 to 6,144 vibrations.

Tones of the seventh octave gave rise to the greatest excursions of the needle. The intensity of sounds was found to be very important, for, as a rule, the intensity required to cause contractions of the muscle was much greater than ordinary conversation. It was surprising that the contractions of the muscle were much smaller than was to be expected by analogy, from the equivalent

of the muscular force exerted by other muscles. The deduction which Bockendahl draws from his experiments, "*that the function of the tensor tympani muscle is virtually that of an apparatus to regulate the accommodation of the ear*," is even more important. Contrary to Hensen's experience who, after every *new* sound, was able to detect movements of the needle inserted into the muscle, he is convinced that after every sustained sound (or noise) he noticed a cessation of motion after relaxation of the muscles. He is also convinced that the needle, which is set in motion by a sound does not return again to its original position when the sound is sustained, but while registering every vibration and impulse, only becomes passive when the sound has entirely ceased.

Bockendahl does not think that his experiments have settled the question at issue, but thinks that it will be the province of future experimenters to determine an accurate means of measurement. The reviewer cannot endorse all the conclusions concerning the office of the tensor tympani muscle during the act of hearing. If the author had passed a needle, or lever, through the membrana tympani and into the body or the muscular process of the malleus, as Politzer, Blake, Bezold, and others did in their experiments on the vibrations of the ossicula, and then had noticed movements corresponding with the sounds perceived, he still would not be justified in reaching any other conclusion than that the process moves in correspondence with the malleus and drum membrane. The very fact that even during the duration of a sound this process does not cease to move, goes to prove that these movements are caused by vibrations of sound. Facts pointing to the accommodation of the muscles are yet to be demonstrated.

2. The most recent invention of ALEXANDER GRAHAM BELL, the photophone, by means of which sound-waves are transformed into light-waves, and these again, by means of a sensitive apparatus of selenium, into electric vibrations, and these again transposed into sounds, by means of a telephone, is deserving of a brief notice. The German edition of the address gives us all important particulars concerning selenium and its peculiar properties. It remains to be seen whether the invention will become available as rapidly as the telephone. And this will depend upon the possibility of constructing the selenium cells in such a manner that they can be replaced readily. So far the difficulties are no less than those encountered by Edison in the construction of a cheap and durable electric lamp.

II.—EMBRYOLOGY AND COMPARATIVE ANATOMY OF THE EAR.

By L. LÖWE, Berlin.

Gustav Retzuis. Contribution to the knowledge of the ear of the vertebrata. His and *Braune's Archive*, 1880, Nos. 2 and 3, pp. 235–244.

A few years ago (1872), Retzuis found a terminal portion of a nerve in the auditory labyrinth of the bony fish, situated in the utricle near its union with the sacculus. Two small nerve filaments, which come from the *ramus cochlearis*, pass to this terminus. Retzuis looks upon this as the first trace of the "pars basilaris cochleæ"; the branches of the nerves he called the rami partis basilaris cochleæ. However, Hasse, who confirmed the presence of these structures in the vertebrate fish, was not disposed to endorse this view.

Taken altogether, we gather from Retzuis, the terminus in question is neither the pars basilaris cochleæ, nor is it, as Hasse and others supposed in the case of the amphibiæ, "a first trace of the cochlea" (pars initialis cochleæ). In fact it is an unique structure, a peculiar and quite unusual terminal formation, which first appears in fish, and later is found, in its most highly developed state, in the amphibiæ, especially the anuræ, and in the reptiles again is stunted. In birds and mammals the traces of this organ become less and less until it is entirely lost in the crista acustica of the frontal ampulla, from which it probably originated by division. The names formerly borne by this organ, *i. e.*, pars basilaris cochleæ, or pars initialis, must, therefore, be discarded. But it is rather difficult to find a fitting name for it.

"Macula acustica utriculi posterior" would, in most cases, be a suitable name. Retzuis has chosen an indifferent title and calls it "macula acustica neglecta," in remembrance of the neglect with which it has so long been treated. The nerve branch belonging to it may fitly be called the ramulus neglectus. How is it about the morphological development of the most important part of the ear, the true pars basilaris cochleæ? As the formation just described does not correspond to it, it is proven that in fish we have no pars basilaris, but only the lagena cochleæ with its nerve terminus.

The amphibiæ are the first to show a trace of a true pars basilaris.

III—PATHOLOGY AND THERAPEUTICS OF THE EAR.

By A. HARTMANN, Berlin.

GENERAL.

1. Hedinger. Report of the Institute for the Treatment of Diseases of the Ear. Stuttgart, 1880.

2. Weil. The results of an examination of the ear of 267 children in an institute. *Monatschr. f. O.*, No. 12, 1880.

3. E. D. Spear. Clinical observations. *American Journal of Otology*, vol. ii, p. 100.

4. Samuel Sexton. A note of aural phenomena after poisoning by chenopodium. *American Journal of Otology*, vol. 2, p. 292.

5. S. Moos, Heidelberg. A rare case of perforating wound of the left side of the skull, etc. These Archives, vol. 10.

6. Albert H. Buck. Fractures of the temporal bone. *American Journal of Otology*, vol. 2, p. 264.

7. J. Hughlings Jackson. Lecture on auditory vertigo. *Lancet*, Oct. 2, 1880.

8. Samuel Sexton. New aural instruments. *American Journal of Otology*, vol. ii, p. 298.

9. Samuel Sexton. Hearing by aid of tissue-conduction. *American Journal of Otology*, vol. ii, p. 114.

10. Victor Bremer. The pathological results of the examination of deaf-mutes, especially in Denmark. Copenhagen, 1880.

11. Une fête des Sourds-muets. *Revue Médicale*, Dec. 4, 1880.

12. A. Paquet. The surgical treatment of diseases of the ear. Lille, 1879.

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1. Hedinger's report includes 2,931 patients. We will limit ourselves to the mention of a few points connected with the statistical analysis of the cases. In eczema of the auricle aud external meatus, Hedinger has derived satisfactory results from the use of Pagenstecher's ointment. In discussing the diseases of the middle ear, the diseases affecting railway employés are carefully considered, and Hedinger agrees with the views advanced by Moos. In chronic catarrh (sclerosis) Hedinger thinks that the use of bichromate of soda and the oleum pini pumilionis affords some benefit. He also uses the vapor of iodine and chloral hydrate. A case is reported in which subjective noises were relieved,

after the removal of a chronic nasal catarrh with adenoid vegetation, by the insufflation of nitrate of silver, 1:3, without the use of the air douche. In a second case, similar results were obtained by the removal of a pharyngeal tonsil by means of the galvano-cautery. The use of the constant current was sometimes attended with most satisfactory results. Hedinger speaks at length of the diseases of the nose, the naso-pharynx, and their treatment, as well as of the importance of ear diseases in relation to life insurance and military service. In respect to the latter, Hedinger thinks that small perforations of the drum-head (not larger than a pea) ought not to unfit one permanently, as much as chronic catarrh of the middle ear. In conclusion, labyrinthine affections and the audiphone and dentaphone are considered.

2. WEIL examined 267 children in an institute in Stuttgart, in respect to their hearing power. Forty-four complained of earache, and of these 20 had tinnitus. This latter symptom was found 48 times. Accumulation of cerumen was found in 35 cases, otorrhœa in 11. Eighty-one children (30.3 per cent.) had impaired hearing, were only able to distinguish the whispering voice at a less distance than 8 metres. The statistics show a large increase in the percentage of deafness corresponding with the increase of age. The great frequency of deafness in children having thus been demonstrated, Weil insists upon a careful examination of every sluggish and inattentive child.

3. SPEAR's first case was that of a woman in whom a facial paralysis set in during the treatment of an otorrhœa complicated with polypi. Some time after a sequestrum, which embraced two of the convolutions of the cochlea, was removed through the external meatus. A second sequestrum contained a portion of the wall of the vestibule and of the upper and horizontal semicircular canals. Cured. The second case was that of an abscess above the mastoid process which developed during the course of an otorrhœa ; pus was found only after the third incision, and was speedily followed by a cure. The fifth case was that of a patient who had fallen on his chin. The result was, besides the loss of several teeth, that the lower wall of the meatus was forced upward, thereby diminishing the calibre of the canal. The remaining cases present nothing of interest.

4. SEXTON adds another case to those previously published, of chenopodium poisoning, in which deafness also ensued. A careful examination was not made.

6. In fractures of the temporal bone, the solution of continuity generally corresponds with the sutures formed by the different parts of which it is composed, *i. e.*, the squamous, petrous, and tympanic bones, and these cases might properly be termed diastasis. Besides these there is a weak point in the middle of the petrous bone, where it encloses the internal meatus auditorius and the cavity of the labyrinth. BUCK describes 14 cases of fracture of the temporal bone in which recovery occurred, and classes them as follows : 1, Fracture or diastasis of the tympanic or squamous portion in the region of the middle ear, without implication of the petrous portion ; 2, fracture of both the pars tympanica and petrosa. Of the first he has seen three cases ; in none of these was the hearing impaired to any extent, and in all of them were the signs of fracture, in the immediate neighborhood of the membrana tympani, easily recognizable. In the next ten cases the tympanic and squamous parts were both fractured, in two of them from gun-shot wounds. In all of these cases deafness was complete ; this may be due either to a fracture, which passes through the labyrinth, or to a hemorrhage into the cochlea. In the 14th case, the deafness only ensued after the occurrence of a meningitis. As far as the diagnostic value of hemorrhages from the ear, after fracture of the base of the skull, is concerned, Buck believes that if there be a flow of blood we can only assume a fracture of the temporal bone in the neighborhood of Shrapnell's membrane, and, perhaps, in the Glaserian fissure. He reports a case in which there was no hemorrhage during life, but there was deafness, and the *post-mortem* showed a bilateral fracture through the middle of the petrous bone, extending upward to the roof of the tympanum. In reference to serous effusion, Buck infers from a case in which there was no deafness, that there was no fracture of the petrous bone, and that the discharge was simply the result of an inflammatory process. In conclusion, Buck discussed the appearance of facial paralysis after fractures of the temporal bone.

7. HUGHLINGS JACKSON gives us a very interesting account of aural vertigo. He differentiates it from epileptic vertigo, which arises as follows : A patient who has a mild attack of epilepsy, or in the beginning of a grave one, feels as if every thing around him were moving, or as if he himself were moving about. In aural vertigo he feels as if every thing around him were moving suddenly from side to side, or revolving on an axis. The uncertain gait

and the aggravation after moving the head are characterized, by Jackson, locomotor symptoms ; the sudden pallor, nausea, vomiting, the intense depression, headache, are vital manifestations. In every case, "the ear is at fault." The ear is affected, but it is evident that the locomotor and vital symptoms arise from some disturbance of the nerve-centres. Jackson has no doubt the ear is the *fons et origo mali ;* in harmony with Sydney Ringer's hypothesis as to the cause of migraine, Jackson believes that every thing which tends to impair health may be a cause of auditory vertigo. If the resistance of the nervous system is impaired, it will be the more susceptible to all sources of irritation arising from the ear. The vertigo is often attributed to gastric disturbances, but these are due to central disturbances. We are only justified in diagnosticating auditory vertigo when there are aural symptoms, and whenever we meet with any attacks of vertigo we ought to examine the ear. Not every attack of vertigo, even though attended with symptoms of aural disease can be referred to that organ. There are attacks of epilepsy which begin with noises in the ear ; in some cases of epilepsy and of epileptiform attacks there is a preëxisting disease of the ear and a probable relation of cause and effect between the two diseases. These two affections are entirely different, and also differ from Méniere's disease.

In conclusion, chronic cases of auditory vertigo are briefly considered ; the vertigo is either constant or it is complicated by eczema.

8. SEXTON describes two new instruments ; a wire snare, in which the wire is fastened in a more complicated manner than in other instruments. The second is a forceps for the removal of foreign bodies ; the two branches of the forceps are retracted by means of a ring and in this way brought together.

9. SEXTON makes a few remarks about the value of the audiphone, and, in harmony with other writers, accords it a very subordinate rank, especially in those cases in which there is autophony, *i. e.*, hearing of one's own voice. Sexton believes that the majority of deaf-mutes hear their own voice, and that only these can acquire articulate speech. (If this were so there would be little difficulty in teaching them to speak.—REP.)

10. After giving us a very elaborate historical introduction, in which the older views on deaf-mutism, the methods of instruction, treatment, and the pathological-anatomical conditions are consid-

ered, BREMER presents a table of the results found in the examination of 303 deaf-mutes of the Institute of Copenhagen (Chap. ii). In 117, *i. e.*, 38.9 per cent., the result was negative, inasmuch as there were neither changes in the external ear, nor on the drum-head or the Eustachian tube. As far as the external ear is concerned Bremer found startling changes in two cases, once macbrotia and once microtia. Uniform funnel-shaped contraction of the external meatus was found in 11 cases; thrombi and foreign bodies were frequently discovered. The most varied alterations were found on the drum-head; total or partial opacities, depression, calcareous deposits, destruction. In 97 cases Bremer found pharyngeal catarrh, and in 47 hypertrophy of the tonsils. In 34 cases catheterization was difficult. In Chap. iii, the pathological changes, which were found in a number of specimens of ear taken from deaf-mutes, are described. There are, however, no notes concerning the patients themselves. Thirty-three specimens are described, and of these we may mention: Malformation of the labyrinth in two specimens taken from the same patient; instead of a labyrinth we have a solid mass of bone. In another specimen there was a total absence of the semicircular canals. In two, taken from the same patient, the posterior semicircular canal was missing, and at the same time there was a fusion of the crura ampullaria of the other canals. The semicircular canals were often found filled with bony or calcareous masses—completely so, in 5 specimens (belonging to 3 patients), partially, in 10 specimens (taken from 7 cases). Absence of the septa of the cochlea was noticed in 6 specimens (3 cases); in four specimens there was a solid protuberance without any convolutions (in these the semicircular canals were filled with bone tissue); in one case the first convolution was filled with bone. Contraction or dilatation of the aquæductus vestibuli or the porus acusticus internus was repeatedly seen.

11. Is a description of an entertainment of deaf-mutes, in Paris, at which the addresses and a play were delivered in pantomime, although the subjects had been taught to articulate with some ease. The editor goes on to say that pseudoparole is not the immediate expression of thought, but only a labored translation, very limited and often unpleasant for the deaf-mute, and for those who must listen to it. We beg to say, however, that the deaf-mute, in acquiring speech, occupies the same relative positions which we do when we undertake to acquire a foreign

tongue. It does not suffice for us to learn a few words in order to speak and to understand this new language. If the deaf-mute is so taught that he commands the method in full, it will become a means of intercourse with others.

12. PAQUET restricts himself, in his monograph, to an enumeration of the usual methods of examination and modes of treatment in diseases of the ear, and fails to give us any original observations.

EXTERNAL EAR.

13. H. KNAPP, New York. Perichondritis auriculæ. These ARCHIVES, vol. x.

14. A. HEDINGER, Stuttgart. On a peculiar exostosis in the ear. These ARCHIVES, vol. x.

15. LUCAE, Berlin. Foreign bodies in the ear. *Real-encyclopädie der ges. Heilk.*, vol. v, pp. 45 and 46.

16. DE SAINT GERMAIN. Removal of a foreign body. Société de Chirurgie. *Progrès Méd.*, Nov. 13, 1880.

17. CHAS. H. BURNETT. Reflex ulceration in the external auditory canal, due to carious teeth. *Amer. Journ. of Otol.*, vol. ii, p. 285.

18. WEIL, Stuttgart. Cases of rupture of the membrana tympani. *Memorabilien*, No xi, 1880.

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15. LUCAE writes of foreign bodies in the ear, and gives us the usual description of the methods of their removal, and the dangers which may ensue when attempts are made to extract them by means of surgical instruments. In addition to the cases in which there was a fatal issue, as reported by Weinlechner and E. Fränkel, he adds those of Levi, Wendt, and Moss.

16. DE SAINT GERMAIN reports the extraction of a china button from the ear. Syringing having proved futile, a small hook was passed into one of the numerous eyelets of the button, and it was thereby withdrawn.

17. BURNETT describes a case of ulceration of the external canal, caused by carious teeth. The ulceration was located on the posterior wall, and was complicated by a perforation of the drum-head. The trouble was repeatedly cured, but invariably returned, until it was found that on the same side of the mouth

there were carious molars. As soon as these were removed a permanent cure was established.

18. Among four cases of rupture of the membrana tympani, which were under WEIL's care, there was one in which there was a double rupture, due to the shock produced by the explosion of a torpedo thrown against the ear. In another case the rupture occurred during the act of urging, and in a third it occurred after an inflation of the ear by means of Politzer's method, and was followed by an improvement of hearing.

SPECIAL REPORT OF THE CONTRIBUTIONS TO OTOLOGY IN ITALY IN THE YEAR 1880.

By T. BOBONE, of San Remo.

Translated from the German.

It is generally well known that very few writers on otology have as yet been found in Italy. The principal reason for this must be that, with the exception of the University in Rome, otology is not officially taught in any part of the kingdom. It is, therefore, readily understood that young physicians and students with us, only with difficulty interest themselves in this branch of study. All this may explain why the following report contains so little. We none the less hope that one of the most important results of the International Congress, held in Milan, in September, 1880, will be to increase the interest in this locality, for this branch of medicine.

1. E. de Rossi (Rome). IX anno di insegnamento della otoiatira. Roma, 1880.

This book of De Rossi's, containing only 55 pages, besides the statistics of the St. Giacomo Hospital's out-door patients in 1879–80, has some observations on the pathology and treatment of various diseases of the ear. The whole number of patients was 516, —310 males, 118 females, and 88 children.

In cases of foreign bodies in the ear, if these bodies were bits of wood or seeds, the author employed for their removal a peculiarly-constructed little hook. Injections, in such cases, De Rossi regards as useless or even as dangerous.

In acute myringitis, with hyperæmia of the middle ear, the author has found the air douche and instillations of lukewarm water very useful, and believes that paracentesis of the drumheads is only exceptionally needed.

De Rossi suggests the necessity of a better classification of diseases of the middle ear, since they arise from various causes and demand various kinds of treatment.

Bezold's antiseptic treatment of suppurations of the middle ear has been found adapted only to the acute cases. In those cases in which the perforation of the membrana tympani, occurred near Shrapnell's membrane, the results were not so satisfactory.

Some results were obtained from the intra-tympanic injections of medicated fluids, in cases of hyperæmia of the middle ear, as well as in the so-called *otitis media hyperplastica.* De Rossi had the opportunity of examining a patient in whom, two years before, he had disarticulated the incus from the stapes. The improvement of hearing which resulted from the operation was retained.

Caries of the mastoid process was observed nine times. All of these patients were operated upon with antiseptic treatment. Seven recovered, one was improved, and one died.

2. Prof. G. Bezzi (Modena). Nuovo metodo curativo di alcune forme di sordita. Spallanzani, 1880, Nos. 1 and 2.

The so-called new method of Prof. Bezzi's consists in the condensation and rarification of the air in the external auditory canal, by means of an instrument invented by the author. The membrana tympani is made to move out and in by the changes in the pressure of the air. The advantage in this to-and-fro movement is in the increased mobility of the ossicles. Besides, the Eustachian tubes are rendered more easily permeable. As is well known, von Tröltsch, Moos, Siegle, Schwartze, Lucae, and others have long since recommended rarification of the air, and the condensation has been recently recommended by Gruber. The new (?) method by Bezzi, *i. e.*, the combination of condensation and rarification, has not as yet been tried upon patients by the inventor.

3. Prof. G. Paladino (Naples). *Giornale internazionale delle scienze mediche*, 1880, fas 4.

Referring to the communications of American otologists in regard to the audiphone and the dentaphone, Paladino calls attention to a paper of his, published in 1876, by which it will be seen that he was the first to make an instrument founded upon the principles of conduction of sound by bone, which is useful for diagnostic and therapeutic purposes.

This instrument was called the *Phonifero*, and consisted of a wooden or iron rod, with peculiarly formed terminal disks. One of these the deaf person holds between the teeth, while the other rests upon the region of the larynx of the speaker. The voice of the latter is carried directly to the teeth of the deaf person. The terminal piece may be placed upon the forehead, the occiput, or the mastoid process.

The advantage of this instrument, according to Paladino, is that the waves of sound are conveyed directly through the *Phonifero* and the bones of the head, to the acoustic nerve, and that they do not first pass through the air, as in the use of the audiphone and dentaphone.

4. Dr. BARGELLINI (Florence). L' audifono, l' elettrofono, ed i sordo-muti. *Gazetta delle cliniche di Torino*, 1880, No. 36.

Together with a detailed description of Rhodes' audiphone and Clarke's electrophone, the author gives the results of the experience that he has had in the Institution for Deaf-Mutes in Sienna. He used four audiphones for his examinations, of which two were made of satin wood, *carton satiné* (Rhodes), one of wood (Dunn), and the fourth of zinc (Colladon). Experiments were made with three deaf-mutes. The first heard the audiphone as a noise, the second and third could repeat several vowel sounds. Other experiments that were made in the institute by Dr. Marchio showed that the audiphone could do good service, of course when the acoustic nerve is not completely paralyzed.

5. Dr. L. BONELLI (Turin). Otite media purulenta consecutiva a febbre teforde. *Gazetta delle cliniche di Torino*, 1880, No. 44.

In a man, 27 years of age, in the St. Jean Hospital at Torino, who was being treated for typhus fever, a very severe pain in the right ear appeared with high fever, tinnitus, and deafness. Dr. Novaro performed paracentesis, by which a little pus was evacuated. The ear was syringed with carbolated water and stopped up with carbolated cotton. The pain quickly subsided. The temperature on the following day was normal. The hearing was restored.

6. Dr. E. GIAMPIETRO (Naples). *Giornale internaz. delle scienze mediche*, 1880, No. 8.

The writer remarks upon the condition of the membrana tympani, after paracentesis, and upon the causes which favor its rapid healing. These causes are found in the blood-vessels, which ex-

ist in abundance on that portion of the membrana tympani where the operation is usually performed. In order to maintain a permanent opening, the author advises that the operation be performed on the middle zone, where the blood-vessels are less numerous. He also describes his speculum, which is similar to that of Kramer. The two halves are a little curved, and end in a mouth 5 *cm.* long. When the instrument is closed the calibre of the speculum is 1½ *mm.* Two little buttons are found on the ends of the bivalved halves. A small needle, having a point like a trocar, passes through the tube. Its point is ½ *mm.* broader than the end of the speculum, so that the whole instrument has the form of a *trocar*. In using this instrument, the speculum is placed in the auditory canal in such a way that the point of the needle comes in contact with that portion of the membrana tympani which is to be perforated. The halves of the speculum are now separated from each other somewhat by a screw on the handle of the instrument, the needle is drawn out, while the end of the speculum remains in the opening that has been made. (?)

(The other writings of de Rossi, Grazzi, Ravogli, that have appeared in Italy in the last few years, have been noticed in our last reports on the Progress of Otology.—EDITORS.)